U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

REPORT

OF THE

UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1935

WITH

APPENDIXES

FRANK T. BELL
Commissioner

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NOTE

The first section of this volume, entitled "Bureau of Fisheries", constitutes what was known in years prior to 1933 as "Report of the Commissioner of Fisheries." Since then, in the interests of economy, it is a reprint from the "Annual Report of the Secretary of Commerce." The pagination, therefore, is the same as that of the Secretary's Report, rather than beginning with page I.

ERRATA

Page 114: The date in footnote 2 should be *1933* instead of *1833*.
Page 287: The footnote at the bottom of the page should be omitted.
Page 331: Page numbers in Table of Contents, Mackerel should be page *344* and Pike-perches should be *370*.

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U. S. DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES

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[Reprinted from the Annual Report of the Secretary of Commerce, 1935]

BUREAU OF FISHERIES

The fishery industry has not shown improvement in recent years to the extent apparent in several other food industries. In fact, during the fiscal year 1935 the fishery industry lost some of the gains which were made during the previous fiscal year. This has been especially true with the fishermen and distributors of so-called "market" fishes. Included in this category are such fishes as haddock, mackerel, halibut, mullet, red snappers, lake herring, and others. As a rule, these fishes are marketed in the fresh and frozen condition. Partial reports from the principal ports indicate a larger quantity of some of these fishes have entered the market during the past year, but the prices received by the fishermen have been less. By far the greater number of our fishermen are engaged in catching market fishes and in many instances these fishermen are unorganized.

During the past fiscal year some improvement has been noted among fishermen catching and selling "cannery" fishes, such as salmon, pilchards (sardines), Pacific coast mackerel, tunas, and others. This may be due to better organization among these fishermen as well as to the fact that canned fish is finding a better demand among consumers. Improvement among the sardine, Alaska herring, and menhaden fishermen, no doubt, has been due to a recent act of Congress, which has brought about a brisk demand in this country for domestically produced fish oils.

The fisheries of the United States and Alaska are prosecuted on the high seas and in the territorial waters of the Atlantic and Pacific Oceans and in the Gulf of Mexico and their adjacent waters, as well as in the Great Lakes and other interior waters. Available data for 1933, when the most recent detailed catch surveys were made, indicate an appreciable increase in both the volume and the value of the catch as compared with the previous year. Statistics of the catch in the New England, Middle Atlantic, Chesapeake, and Pacific States, and Alaska were collected for 1933, and when considering the combined catch of these sections alone an increase of 13 percent in the volume and also 13 percent in the value of the catch in 1933 is indicated as compared with the same sections in the previous year.

Based on the most recent surveys, our commercial fisheries gave employment to about 118,000 fishermen, and their catch aggregated 2,899,908,000 pounds, valued at $60,218,000. There were increases in most of the groups of prepared products. The output of canned products amounted to 533,212,000 pounds, valued at $59,800,000, representing an increase of 28 percent in volume and 37 percent in value as compared with 1932; the output of fishery byproducts was valued at $17,466,000, representing an increase of 40 percent; and the production of frozen fishery products amounted to 95,874,000 pounds, estimated to be valued at $8,000,000, representing an increase of 4 percent in quantity and 14 percent in the estimated value. The output of fresh and frozen packaged fish and shellfish amounted to 129,608,000 pounds, valued at $17,294,000, and cured fish, 104,310,000 pounds, valued at $12,823,000. It is estimated that about 500,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $40,000,000, were marketed during 1933. The total marketed value to domestic primary handlers of all fishery products in 1933 is estimated at about $155,000,000.

Imports of fishery products for consumption in the calendar year 1933 were valued at $30,462,000, which is 3 percent more than in the previous year, while exports of fishery products were valued at $8,339,000, or 7 percent more than in 1932.

FISHERY ADVISORY COMMITTEE

During the year the Secretary of Commerce appointed a Fishery Advisory Committee, representing various branches of the fishing industry, various geographical sections of the country, and related interests including science, medicine, and transportation, for the purpose of considering fishery problems from a national standpoint and offering recommendations for promotion and development.

The first meeting was held on May 6 under the chairmanship of Bernarr MacFadden and various subcommittees were appointed to give detailed study and to later report on specific fields. Committees were appointed on the protection of migratory fish, on game fish, on the relation of the fisheries to other water uses, and on scientific research. Committees were also appointed on food standards, on marketing and distribution, on international trade, and on education and publicity. All of these committees presented preliminary reports and drafted a program of future activities to be the subject of reports at the fall meeting in 1935.

EFFECTUATING A BETTER RELATIONSHIP BETWEEN COMMERCIAL AND SPORT FISHERMEN

From time to time considerable animosity has existed between commercial and sport fishermen. At times the sport fishermen have accused the commercial fishermen of depleting certain fisheries while, on the other hand, the commercial fishermen have censured the sport fishermen for trying to take away their means of livelihood. This, no doubt, has led to the enactment of some legislation parading under the guise of " conservation ", which in some cases has resulted only in transferring the fishery problems from the hands of one group to another. For this reason there is a need for greater amity between these two groups, to the end that our great natural fishery resources will be prosecuted wisely. It is important that both groups give coordinated consideration to measures intended to sustain our fish supply. During the past year headway was made in this direction.

Members of the National Fishery Code Authority, representing the commercial fisheries, met with members of the National Planning Council of State Fish and Game Commissioners at the council's meeting at Montreal in September 1934. At this meeting various common problems facing the fisheries were discussed and the ground-work laid for further cooperation in effectuating the conservation and sustained production of our fishery resources.

A local meeting similar to the above was held in Baltimore early in 1935 which was attended by commercial fishermen and anglers from the Chesapeake Bay section. Here various measures were discussed which were directly connected with the activities of these groups, and the discussion resulted in the meeting sponsoring fishery legislation of benefit to all concerned. Other such meetings have been held in various other sections of the country.

COOPERATION WITH STATES AND EDUCATIONAL INSTITUTIONS

For many years the Bureau has had valuable informal cooperation in fishery investigations with many institutions, both public and private, but the acceptance of formal cooperation was not authorized until the passage of the act of Congress approved May 21, 1930.

In connection with fish-cultural operations the closer cooperative relations with the States as initiated and developed by the National Planning Council of Commercial and Game Fish Commissioners has been unusually effective. During the past year developments of this nature have been largely a consolidation of cooperative procedure and a refinement in the working details of the various cooperative arrangements existing with a majority of the States. Arrangements have been made for several additional States, particularly Iowa, to review Federal applications for fish. The State of Vermont has afforded generous help in a financial way in meeting the costs of operation at the extensive brook-trout egg-producing plant maintained by the Bureau in the White Mountain National Forest, N. H. Tennessee and West Virginia have furnished food for fish held at the Bureau's hatcheries and have handled the distribution of these fish when they were ready for release. A number of the Western States have continued to supply helpful cooperation in the collection of trout eggs and are compensated therefor by receiving a proportion of the eggs taken. There has been a joint operation of trout and shad hatcheries in the State of South Carolina.

Many of the cooperative fish-cultural arrangements are largely a matter of administrative detail and are too voluminous for a full recital, but their effects have been plainly evident in a greater efficiency. In fact, it may be said that in several instances State and Federal fish-cultural facilities are practically interchangeable as far as stocking is concerned, and real distinction lies only in their being administered by different agencies.

California has continued its cooperative scientific investigations with the Bureau concerned with the trout supply, looking toward the more adequate supply of streams and the more rational regulation of fishing within its borders. New York State has continued its cooperation in the conduct of studies of the nutritional requirements of trout to improve hatchery practices in feeding and rearing. Oregon has cooperated with a Bureau investigator in a study of fish diseases and hatchery practices. North Carolina, Connecticut, and Washington have assisted in investigations for the restoration of oyster beds in their coastal waters; and Georgia, Louisiana, and Texas have taken an active part in the study of the important shell fisheries of the South Atlantic and Gulf coasts. Despite the fact that State budgets have been reduced proportional to Federal budgets for these projects, this cooperation has been very effective and is greatly appreciated.

Another source of most valuable cooperation is provided by educational institutions, chiefly State universities. Laboratory quarters for the Bureau's investigative staffs are provided by Harvard University as headquarters for North and Middle Atlantic fishery investigations. University of Michigan has headquarters for the Great Lakes fishery investigations, University of Utah for fishery investigations in the intermountain section, University of Missouri for investigation of interior waters, and Stanford University for California trout investigations. The Wisconsin Natural History Geologic Survey has cooperated with the Bureau in many ways. Yale University, Cornell University, the University of Washington, and the Oregon State Agricultural College have likewise provided quarters or others facilities for investigative work.

In the technological work of the Bureau many State agencies have cooperated in extending their facilities for the prosecution of these studies. State universities, hospitals, agricultural experiment stations, and other State institutions of research have contributed personnel and laboratories in various projects. Among the institutions represented in this work during the past year were the South Carolina Food Research Commission and State Medical College, the Massachusetts State Agricultural College, the New York State College of Agriculture, Washington State College and Agricultural Experiment Station, the University of Washington, George Washington University, and the University of Maryland.

The value of this type of cooperation in the scientific fields cannot be overestimated. The Bureau's investigators receive, in addition to actual laboratory and office quarters, the use of university libraries, advice and assistance from the university faculties, and many other courtesies which stimulate a community of interest in technical problems of the fisheries. The universities thus contribute to research of practical value and application to their own communities, and their graduate students receive stimulation and advice in research problems similar to those of the Bureau and frequently part-time or temporary employment in Bureau projects, all of which contributes to the progress of aquatic biology and technology in the United States.

In the Bureau's statistical research of the fisheries of the Great Lakes and Pacific Coast States and of the States of Maryland and Virginia such exceptional cooperation has been obtained from State fishery agencies in recent years that the Bureau has conducted only limited surveys to supplement the data available from the States.

COOPERATION WITH OTHER FEDERAL AGENCIES

The Bureau's program has always been closely correlated with work of the various Bureaus of the Department of Commerce, from which it secures assistance of various kinds, chiefly relating to the promotive aspects of commercial fishery investigations.

At the close of the year plans were being developed for one project in North Carolina whereby a hatchery would be constructed and turned over to the Bureau for subsequent operation, with the object of providing fish for the surrounding territory.

The Bureau has been called on to make a survey in the Tennessee Valley to aid the Tennessee Valley Authority in developing a program of conserving fishery resources and establishing a hatchery system.

The United States Army Engineers have given sympathetic consideration to the Bureau's recommendations, with regard to developments in the upper Mississippi River area. This has been based upon a hope that the dams comprising part of the 9-foot channel development might be modified so as to provide extensive propagating ponds for the production of fish native to that area. In connection with the work on the Bonneville Dam (later discussed in more detail) the War Department allotted funds from its construction appropriations that the Bureau might carry on studies and design ways for passing the run of salmon over this new dam.

Through the cooperation of the Navy Department the annual supplies for the Pribilof Islands were forwarded from Seattle on the U. S. S. *Sirius*, and the season's take of sealskins was brought out by this vessel on its return voyage. The United States Coast Guard also rendered valuable assistance in maintaining a patrol for the protection of the fur seals and in performing other services.

The nature of the work performed by the National Park Service, Forest Service, the Office of Indian Affairs, the Bureau of Reclamation, and the Bureau of Biological Survey gives them of necessity an interest in the Bureau's fish-cultural work. The stocking of streams and lakes under the control of the foregoing agencies was an important feature of their administration. Consequently, it has been necessary to maintain closer contact with these establishments, and it is felt that the Bureau has been of real service in numerous instances.

While these cooperative relationships are of a more or less standing nature, there have been contacts with the newer emergency organizations which offer prospects of mutual value. The Agricultural Adjustment Administration, insofar as its work covers the utilization of marginal lands, has called on the Bureau in several instances to plan a program for fish propagation and the provision of angling.

Various members of the Division of Fishery Industries assisted other Federal agencies in the conduct of technological and economic studies relative to the fishery industry. In this connection special aid was rendered the National Recovery Administration in the development of fishery codes, a member of the Bureau being on detail to that Administration until October 1, 1934, to supervise and assist in this work; the Department of Agriculture, in various nutrition studies; the Federal Emergency Relief Administration, in fishery relief projects; the Federal Surplus Relief Corporation, in supplying data on the fishery food situation; and the Reconstruction Finance Corporation, on loans to the fishery industry. One member of the Bureau has been appointed a member of the food survey committee of the Departent of Agriculture, which investigates the supply and price situation of surplus foods.

The Bureau has had the cooperation of the Bureau of Agricultural Economics in the collection of statistics on the volume of cold-storage holdings of fish; and the cooperation of the health authorities in Washington, D. C., in obtaining the volume of fish handled at the Municipal Fish Wharf and Market in this city. In another instance the Burau obtained figures on the volume of the quarterly holdings of fish oils for the Bureau of the Census.

CONSTRUCTION ACTIVITIES

At the start of the year there were small unexpended balances in approximately 12 allotments for the repair and reconditioning of fish hatcheries. These allotments had been made by the Public Works Administration during the previous year, and the work was carried to a conclusion during the fiscal year 1935.

A considerable portion of a similar allotment for the continued development of the Leetown (W. Va.) experimental hatchery remained available and was expended in part for the construction of bass and trout ponds, remodeling of one of the buildings, and construction of a new dwelling.

Early in the year a new Public Works allotment of $75,000 was received for the construction of a pond-fish hatchery at Harrison Lake, Va., 26 miles southeast of Richmond. Work was started during the winter and at the close of the year approximately 15 acres of ponds were virtually completed and other developments were well along to the point where the establishment could go into active operation during the fall of 1935. Arrangements were being made for the propagation of shad as well as pond fish at this point. Two dwellings as well as various service buildings comprised the structural improvements. The water supply, which is obtained from a lake, is fed through a canal.

In general, the construction and improvements effected during the fiscal years 1934 and 1935 can be credited in part for the increased hatchery output attained during the latter year.

CONSERVATION OF WHALES

The Multilateral Convention for the Regulation of Whaling agreed to by the economic committee of the Council of the League of Nations on September 24, 1931, became effective on January 16, 1935, in consequence of the deposit of the ratification of the convention by Great Britain and Northern Ireland on October 18, 1934. The convention was ratified by other nations as follows: United States, July 7, 1932; Norway, July 18, 1932; Union of South Africa, January 11, 1933; Switzerland, February 16, 1933; and Mexico, March 13, 1933. In addition to these ratifications, the following have signified adherence to the convention: Nicaragua on April 30, 1932; Sudan, April 13, 1932; Monaco, June 17, 1932; Brazil, November 21, 1932; and Egypt, January 25, 1933.

A bill has been introduced in Congress to give effect to the convention.

BIOLOGICAL FISHERY INVESTIGATIONS

The major portion of the research looking toward the conservation of the fishery resources of the United States is conducted by the Division of Scientific Inquiry. Some of the States maintain research stations and laboratories and some a single fishery biologist, but as a general rule the State governments do not conduct fishery research on any considerable scale. Many, however, contribute or cooperate effectively in scientific work conducted by the Bureau as has been mentioned previously. This cooperation should be developed and extended.

Research activities are about equally divided among three important fields. These are (1) aquicultural investigations including studies on the improvement of hatchery technique for both cold and warm water fishes and the planning of rational stocking policies in interior waters, (2) commercial fishery investigations concerned with the changes in abundance of the food fishes of the coastal areas and the Great Lakes, the detection of overfishing, and the correction of abuses in the commercial fisheries, and (3) shell-fishery investigations directed toward improving the quality of oysters, increasing production by cultural methods and combating oyster pests.

The technical staff of the Division of Scientific Inquiry numbers 45 trained experts, with perhaps an equal number of temporary assistants at some times of the year, but the problems of the fisheries are as numerous as the species that are exploited. Some 30 important food and game fishes are the subjects of continuing research, but to give adequate attention to the fisheries in all sections of the United States—coastal, interior, and in Alaska—would require double the number of present investigators.

AQUICULTURAL INVESTIGATIONS

The problems of the fresh-water fisheries throughout the country at present are concerned chiefly with increasing hatchery output and properly stocking interior waters. In carrying out the latter program, the discovery of suitable natural conditions by means of stream surveys, the conditioning of streams to improve their fish carrying capacity, and the control of stream pollution are vital to its success.

Pond-fish culture.—Investigations in pond-fish culture were conducted during the past year at the Natchitoches (La.) fish hatchery. These investigations were designed primarily to throw light on the problems which have arisen in connection with pond culture in the Southern States where conditions in many respects are quite different from those found in hatcheries in the North. Experiments during 1934, designed primarily to furnish a comparison of the value of different fertilizers show that cottonseed meal and other fertilizers are beneficial in producing a large crop of forage organisms on which the fish feed, but that food production alone is not directly correlated with fish production. In heavily fertilized ponds large numbers of small fish may be produced for early distribution, but additional forage food is required to carry the bass through the summer until October or November.

Trout culture.—Trout cultural investigations have been conducted at the experimental hatcheries located at Pittsford, Vt., and Leetown, W. Va. Here experiments were designed to determine the most economical ration for the feeding of both fingerling and older trout. Detailed observations were made on the food requirements of fish of the same species at different ages and of the different species of trout as a guide to more economical general hatchery practices. Selective breeding experiments have also been conducted at these two stations to secure a superior strain from the point of view of growth, egg production, and disease resistance. Future brood stock was selected from fish of known lineage for propagation of future supplies.

Fish nutrition.—At the United States Fishery Station, Cortland, N. Y., cooperative investigations of fundamental problems of trout nutrition, which have been under way for several years with the State of New York, Cornell University, and the Bureau, have been continued. As a result of these investigations, improved trout diets have been devised and numerous problems regarding the digestibility of food materials have been solved that should aid in reducing cost of hatchery operations throughout the country. Similar study of hatchery and stocking problems have been undertaken on a cooperative basis in California, concerned primarily with problems of managing the supply of steelhead trout in coastal streams and of the various trout species in the high mountain regions.

Fish pathology.—Progress has been made during the year in the study of fish diseases that annually take heavy toll of the fish in hatcheries. Experiments on two of them, the so-called " ulcer disease " and " blue sac disease ", have been made in an effort to find preventives or cures, and a clinic or disease service has been established to aid fish culturists in their practical problems of disease prevention. In this service prompt diagnosis of diseases is given by mail when fishes are sent to the laboratory for examination.

Stream surveys.—Utilizing funds provided by the Public Works, stream surveys were conducted by 16 parties operating in forests and parks in various parts of the country. The primary purpose of the surveys was to provide an inventory of conditions that affect the fish population in each lake and stream. With this information at hand, it has been possible to determine to what species of fish each body of water is best adapted and the number it can support most advantageously. One-sixth of the waters of our national forests have been surveyed during the past year, with the result that many miles of water formerly stocked have been shown to be worthless and in some localities suitable waters are neglected. Greater economy and efficiency can, therefore, be introduced into the stocking program.

In connection with the stream surveys, extensive work in stream improvement was carried out in the national forests for the purpose of increasing the carrying capacity and food production in streams. Since there are few reliable data on which to base an estimate of the true value of stream improvement, the work was primarily experimental, and its real result will be apparent only after several years.

Pollution of waters.—One of the most serious limitations on the maintenance of abundant stocks of food and game fishes in interior waters and the chief hindrance in stocking these waters with additional supplies is pollution from domestic and industrial sources. The destruction of fish life by polluting substances, already acute in many localities, is rapidly growing throughout the more densely settled and industrialized sections of the country.

Without authority, until the passage of the " Coordination Act " March 10, 1934, the Bureau has made during the past year, with an allotment of funds from the Public Works Administration, a very promising start on an investigation of pollution problems related to the conservation of aquatic life. The standards of water purities for the protection of aquatic life differ from those applying to industrial uses of water or for the protection of public health, and are to a certain degree more exacting.

Lacking suitable standards for the evaluation of polluted streams as fish habitats, research has been directed during the past year to a detailed study of the physiological effects of various polluting substances and the establishment of standards of purity for the maintenance of an abundant fish fauna. A manuscript has been completed for publication that establishes these minimum standards for fish as a guide to efforts at stream-pollution abatement.

In addition to the laboratory studies involved in this work detailed surveys of actual conditions in the stream inimical to fish life because of pollution have been made in widely scattered areas throughout the Mississippi drainage.

COMMERCIAL FISHERY INVESTIGATIONS

Although the total yield of the commercial fisheries in the United States has been maintained, and even increased during the past quarter of a century, many of the important commercial species are undergoing progressive depletion. The Bureau's investigations of commercial fisheries are organized, therefore, as continuing observations of the condition and trend of the important commercial fisheries, rather than as disconnected and temporary inquiries or surveys. Their purpose is to trace from year to year variations in the supply of food fishes resulting from natural causes, the early detection of the first signs of serious depletion, and the recommendation of legislation or control of fishing operations and the correction of abuses to maintain the fisheries on the basis of sustained yield. Such investigations are the sole guide to wise conservation policies.

Haddock.—In the North and Middle Atlantic sections biological and statistical studies have been continued on the fisheries for haddock, mackerel, squeteague, scup, and other shore fishes from the offshore Nova Scotian banks to North Carolina. Chief attention has been given to measuring accurately the fluctuations in the supply of haddock available for fishermen. This catch analysis shows that the haddock population on the principal northeast banks was at a low level of abundance in 1935. In fact, marketable haddock were not more than one-third as abundant as during the period 1926–28. As a result of this scarcity, the United States fleet is now forced to fish on banks off the Nova Scotian coast, a distance upward of 600 miles from their home ports. Numerous biological data on age composition, growth rates, and mass movements of the haddock population indicate that the scarcity is due to intensive commercial fishing which is removing haddock from the sea at a more rapid rate than natural replacement by reproduction and growth. One of the causes of this scarcity is the loss of large quantities of undersized and immature fish destroyed in the course of regular trawling operations.

Mackerel.—Mackerel investigations have been designed to discover the best possible use of the fluctuating supply that nature provides. One means is to protect the future abundance of mackerel so that the industry may adjust itself to the expected supply, and the other is to find out if possible whether a more stable and more valuable supply of large mackerel would result from reducing the intensity of fishing on the young. Predictions of the general abundance of mackerel in advance of each season have been made annually for some years. During the fiscal year 1935 predictions for the previous season were checked by analyzing catch statistics to note the effect of the curtailment program of the industry under the code of fair competition. Results of the check indicate that the prediction of abundance was correct within 10 percent. A prediction for the 1935 season was prepared in May of the current year. The rate of catching mackerel in the early part of the season was entirely in accord with the prediction which anticipated an unusually heavy run during the early months. Extensive biological observations on the life history of the mackerel have been continued and a comprehensive report that will guide future conservation policies is in the process of preparation.

Shore fish of the Middle Atlantic States.—Further observations have been made regarding the state of the supply of the squeteague, scup, sea bass, flounders, and minor species taken in great quantities in the inshore regions from Cape Cod to North Carolina. Further details of the life history and migrations of the most important species, the squeteague or weakfish, perfect our understanding on the relationship between the centers of production in the southern portion of the range and the yield of the fisheries in New Jersey and New York. Fully one-half of the total supply taken north of Delaware Bay is derived from spawning in southern waters. Conservation, therefore, must be promoted by regulating the strain of exploitation from Chesapeake Bay southward, rather than by drastic restriction of the catch in northern waters.

Regulation of the New Jersey shore fishery is complicated by the rapid development of the offshore trawl fishery of Virginia. The catch of this important branch of the industry has been shown to depend not only on the abundance of fish but on the degree of availability which is affected by changes in water temperatures. Wastage of immature fish in southern waters constitutes a heavy drain upon the supply. Depletion has not yet been demonstrated, although its possibility as a result of severe exploitation in the shore areas in the summer and the offshore areas in the winter is clearly recognized.

Shrimp investigations in the South Atlantic and Gulf States.—Landings of shrimp, the most important fishery in the South Atlantic and Gulf States, have declined since 1930. No evidence has been secured of the depletion of the supply in the Gulf area, but on the South Atlantic coast great fears are felt for the future of the fisheries.

Previous investigations have outlined in some detail the life history and development of the most important species of shrimp. During the past year chief attention has been given to a study of mass movements of this species, since local variations in supply, particularly on the Atlantic coast, are very evident. Efforts are being made to trace the movements of the shrimp by the changing composition of populations and by direct tagging experiments. Tagging, however, is a difficult process and considerable attention has been given to the perfecting of a technique for this purpose. It is suspected that a considerable supply of shrimp may exist in offshore waters during the winter period, but the lack of a suitable research vessel prevents an immediate attempt to survey offshore fishing grounds or to follow shrimp migrations.

Great Lakes fisheries.—Owing to the continued curtailment of the budget, no field work was conducted on the Great Lakes during the past year. The staff, however, has been engaged in analyzing material gained in previous years' observations and in assisting in legislative matters with the States.

The most urgent need in this region today is concerned with uniform regulations of commercial fishing. Many attempts in the past have failed to secure coordinated legislation among the States, but progress in improving conservation laws has resulted from many conferences during the past year.

An intensive statistical study of the commercial fisheries in Great Lakes waters of the State of Michigan has been continued. These studies, based on detailed records secured by the State Conservation Department, demonstrate the rapid depletion of whitefish supply by deep trap nets, and the statistical evidence of their destructive action was directly instrumental in securing legislation regulating and restricting the use of this gear.

A study of the life history of the important commercial species of the pike perches is nearing completion, and similar studies of the yellow perch were pursued.

Pacific coast fishery investigations.—One of the most important undertakings of the Division of Scientific Inquiry is a comprehensive program of investigation of the salmon fisheries of the Columbia River, begun in July 1934. The aims of this investigation are:

1. To provide for rational regulation of a commercial fishery in the lower Columbia in order to permit an adequate escapment of fish for spawning purposes.
2. To assure free passage of spawning migrations over the various dams in the Columbia River.
3. To provide for increased spawning in the upper tributaries by removing all unnecessary obstructions and by rehabilitating spawning grounds formerly productive.
4. To improve artificial propagation of salmon and to increase production by reestablishing runs in suitable tributaries.
5. To improve survival by reducing the pollution hazards.
6. To prevent loss of downstream migrants in unscreened irrigation diversions.

A complete survey of the river system has been undertaken in order to assess these various problems, including a detailed analysis of the commercial catch from earliest times to the present. Detailed recommendations were offered by the Bureau to the War Department for the construction of fish protective works at Bonneville Dam including four gravity fish ladders of an improved type and three fish locks or hydraulic lifts for conveying spawning fish over the dam, and a series of fingerling bypasses to protect downstream migrants; $3,200,000 has been allotted for this construction and although the problems of fish protection are by no means solved, the Bureau is confident that effective protection of the Columbia River salmon runs at this point will be afforded.

With an allotment from the Public Works Administration, the Bureau has constructed screens for three important diversions on the Yakima River for the protection of young salmon from loss in irrigation canals of the Reclamation Service. Two additional screens were constructed on other watersheds for a similar purpose.

The studies recently undertaken on the salmon fisheries of Puget Sound have also been continued with special attention given to the sockeye and coho salmon fisheries. Details of the life history of these fishes have been studied as a basis for future protection, and a statistical analysis of the sockeye salmon fishery of the Frazer River area was made which demonstrates the severe depletion of this important stock of fish and emphasizes the need for international regulation of the fishery.

Studies have been continued on the two most important species of salmon in Alaska, namely, the red salmon and the pink salmon. Studies of the red salmon of Karluk River system, which require continued observations for many years, were conducted during the past year for the purpose of determining production from known escapements of spawning fish. Records for eight generations are now available, showing wide variations in production, varying from a ratio of return to escapement from 0.6 to 1 to 5.6 to 1. There seems to be little possibility of regulating spawning escapement so as to produce consistently a large population. Hence, efforts are being directed to the determining of factors which determine survival in order to control natural forces and to regulate the fishery in the interest of conservation.

Similar studies of the changing abundance of pink salmon have also been continued in southeastern Alaska. Results of this study show that wide fluctuations may be expected in the yearly abundance of this species. Studies of the effect of rainfall and stream flow, as it affects spawning conditions, and population density in the sea, affecting rate of growth and time of migration, hold the key to better regulation of the fishery.

Further studies have been pursued of the depletion of the herring in limited areas in Alaska, with a view to determining the units of population that make up the herring supply. Supplementing biostatistical analyses of the races of herring, large-scale tagging experiments have been undertaken to trace the migrations and to find the limits of movement of the various stocks. Recovery of tags has been facilitated by the perfection of an electric device for detecting tagged fish in commercial catches. Detailed records of actual migrations are now being secured to guide the drafting of more effective fishery regulations.

SHELL-FISHERIES INVESTIGATIONS

Investigation of the various problems relating to oyster culture were carried out in all the principal centers of the industry of the Atlantic and Pacific Coastal States and the Gulf of Mexico. The work was expanded by an experimental study of the effects of oil pollution in Louisiana waters, which demonstrates the dangers to aquatic life of the development of petroleum supplies in coastal waters.

In the New England area the larger part of the work was a continuation of the investigation of the growth and fattening of oysters started by the Bureau in the spring of 1932. The effects of water temperature and varying amounts of various chemical constituents of sea water were studied in relation to nutrition of oysters and the storing of glycogen or animal starch. These studies are fundamental to practical methods of improving the quality of market oysters through artificial feeding or the control or selection of the environment.

A number of investigations and surveys were conducted in the South Atlantic States with a view to rehabilitating public oyster beds in North Carolia and Florida, and studies on the cultivation of the native Olympia oyster in Puget Sound were continued. A practical result of this latter undertaking has been the prediction of the precise time of setting of oyster larva in Puget Sound, enabling the oystermen to regulate their planting activities so as to secure a maximum set of seed oysters.

In order to answer many requests regarding the cultivation of hard clams, a minor research project was undertaken on the life history of this valuable shellfish. Much information has been secured in Long Island Sound regarding its life history, habits, and physiology, as a basis for developing practical methods of propagation.

Oyster pest control.—Near the end of the year a special appropriation of $100,000 became available for a study of means of controlling various pests of the oyster that have reached epidemic proportions, menacing the existence of cultivated and natural beds. A staff of competent investigators was recruited and headquarters were established at Milford, Conn., to study means of controlling the depredations of starfish; at Bivalve, N. J., and Beaufort, N. C., for the control of the drill, which is the most important oyster enemy in the Middle Atlantic section; and at Apalachicola, Fla., for combating the leech, a flat worm which has recently become extremely destructive of valuable oyster supplies in Florida. The steamship *Kittery* was transferred from the Shipping Board, without exhange of funds, to the Federal Emergency Relief Administration for use in the drill control work in the vicinity of Norfolk, Va. This investigation will continue throughout the next fiscal year with the hope of demonstrating practicable methods that can be applied on a large scale by the Federal or State Governments and by private oyster planters in controlling the most important enemies of the oyster industry.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The control of commercial fishing in Alaska was administered as usual in accordance with general laws and regulations for the conservation of the fisheries. A consistent program has been followed, the main object of which is to assure an adequate escapement of brood fish to maintain a maximum supply. A breeding reserve of 50 percent of the salmon runs is regarded as the minimum requirement. Careful observations of the runs are made each season, and when signs of depletion are evident in any locality appropriate remedial measures are initiated.

An unusual abundance of salmon in practically all areas characterized the 1934 season, and few additional restrictions on commercial operations were imposed. In some instances existing restrictions were relaxed as the season advanced. Revised regulations for the protection of the fisheries in 1935 were issued on January 19, the most important changes of which were the prohibition of commercial fishing in the Bristol Bay region during the red-salmon runs in order to build up the weak cycle appearing in the calendar years divisible by 5, and the closing of 31 trap sites to permit a greater escapement of salmon to the spawning grounds and to check the tendency of this form of gear to monopolize fishing in certain localities.

Twelve regular and 164 temporary employees were engaged in patrolling the fishing grounds in the 1934 season in addition to the crews of 12 vessels of the Bureau and 3 chartered vessels. More extensive use than in previous years was made of chartered airplanes as an auxiliary patrol and for general supervision of the Bureau's work and inspection of the spawning areas.

Weirs for counting the escapement of spawning salmon were operated in 12 typical salmon streams in the calendar year 1934. An allotment of Public Works Administration funds enabled the reestablishment of several of these structures, both in 1934 and 1935. The counts of salmon thus made furnish valuable information in connection with life-history studies, as well as providing a means of determining the ratio of escape to catch. Scientific investigations in regard to salmon, herring, and clams were continued.

Some work was accomplished in the removal of log jams and other barriers that prevented the passage of salmon upstream to the spawning beds. In certain localities, also, natural propagation conditions were improved by the destruction of predatory fishes that feed upon the salmon eggs and fingerlings. This work was done partly by weir operators and stream guards, but chiefly through the appropriation of funds for the purpose by the Territorial Legislature and by contributions of local packers in the Bristol Bay and Yakutat regions. At its 1935 session the Territorial Legislature again appropriated $15,000 for clearing salmon spawning streams and for the destruction of predatory enemies of salmon, to be expended under the same provisions as in the case of similar previous appropriations.

ALASKA SALMON HATCHERIES

Only one salmon hatchery was operated in Alaska in the fiscal year 1935—that of the Pacific American Fisheries at Hugh Smith Lake, in the southeastern area. At this hatchery 10,221,000 red-salmon eggs were collected, from which 9,860,000 fry were produced and liberated in Alaska waters. Under the provisions of the Alaska fisheries act of June 26, 1906, the owners of private hatcheries receive a rebate on license fees and taxes on their catch and pack of salmon at the rate of 40 cents for each 1,000 red or king salmon fry liberated.

PRODUCTS OF THE FISHERIES

Notwithstanding the fact that some branches of the industry were handicapped by reason of the longshoremen's strike on the Pacific coast, which for a time caused a shortage of containers and other supplies, and by price disagreements between fishermen and packers in southeast Alaska and the Copper River area, the total output of fishery products was the largest in the history of the Territory. This exceptional harvest may be attributed especially to the abundance of salmon in virtually all producing centers and also to increased activity.

Salmon products comprised about 80 percent in quantity and 92 percent in value of the entire output of the Alaska fisheries. The total production of salmon amounted to 372,585,000 pounds valued at $38,749,000, or an increase of about 42 percent in quantity and 32 percent in value over the output of the preceding year. About 96 percent of the salmon products in the 1934 season consisted of canned salmon, the pack amounting to 7,481,830 cases, valued at $37,611,950. Red salmon represented 35 percent and pinks 51 percent of the total pack of canned salmon, as compared with 42 percent for each of these species in 1933.

The production of herring was also above the average, with a record output of meal and oil, inasmuch as large numbers of the fish taken were too small for satisfactory Scotch-curing. Halibut products declined in quantity but increased in value. A whaling station that had been closed since 1930 was reopened and the total output of whale products was more than double that for 1933. All minor species except clams showed an increased production in the 1934 season as compared with the previous year, the most marked gain being in the crab industry.

The total output of Alaska fishery products in the calendar year 1934 was 468,424,000 pounds, valued at $41,963,000, as compared with an average of 360,097,000 pounds valued at $35,845,000 for the 5-year period from 1929 to 1933, inclusive. The value of the catch to the fishermen was approximately $11,707,000, or about $2,618,000 more than in the preceding year. There were 26,190 persons employed in the various branches of the industry, as against 21,695 in 1933.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

The chief activity in the fur-seal service is the annual take of sealskins for commercial purposes during the months of June and July. Killings are confined as far as possible to 3-year-old male seals, of which approximately 50,000 are secured each season. Of the skins obtained on St. Paul Island, the majority are taken by the stripping process and blubbered before curing. The method of skinning by hand is still used altogether on St. George Island, where less than one-fourth as many skins are taken as on St. Paul Island.

Sealing operations were performed by Pribilof Islands natives and by approximately 60 natives from the Aleutian Islands under the direction of a staff of regular employees. Nineteen employees of the Fouke Fur Co. were at St. Paul Island during the season to assist with the washing and blubbering of the sealskins in accordance with the fur-seal contract.

An allotment of $3,000, by the Public Works Administration, enabled the reconditioning and repair of several buildings used in the sealing industry. Some improvements were made also in the way of construction of new buildings and boatways and the extension of surfaced roads to facilitate transportation of sealskins from the killing grounds to the curing stations.

Delivery of 15 percent of the season's take of sealskins was again made to the Dominion of Canada under the provisions of the international treaty for the protection of the fur seals. The skins were delivered to a representative of that Government at Seattle in August 1934. The Government of Japan, which is also entitled to 15 percent of the sealskins taken at the Pribilof Islands, continued to have its skins handled with those of the United States, receiving an appropriate share of the proceeds of the sale.

Two hundred sealskins were allotted to the United States as its share of the take by the Japanese Government on Robben Island in 1934. They were received by the Department's selling agents at St. Louis, Mo., in December.

SEAL HERD

As of August 10, 1934, the computed number of animals in the Pribilof Islands fur-seal herd was 1,430,418, an increase of 111,850, or 8.48 percent, over the corresponding figure for 1933.

TAKE OF SEALSKINS

In the calendar year 1934 there were taken on the Pribilof Islands 53,468 fur-seal skins, of which 42,972 were from St. Paul Island and 10,496 from St. George Island. This is a decrease of 1,082 from the number taken in 1933.

SALE OF SEALSKINS

Two public-auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1935. On October 15, 1934, 10,000 black-dyed, 3,000 logwood brown-dyed, and 6,000 of the new safari brown-dyed skins were sold for $336,846.25. At the same time three confiscated fur-seal skins, parchments, were sold for $7.50.

The second sale, held on April 8, 1935, consisted of 12,600 black-dyed, 11,500 safari brown-dyed, and 2,303 logwood brown-dyed skins, which brought a gross sum of $616,990.75.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1935 consisted of 1,607 black-dyed, 1,843 safari brown-dyed, 1,027 logwood brown-dyed, and 300 raw salted skins, which brought a total gross sum of $98,460.44. In addition, the Department advertised and sold to the highest bidders for $621.22 two fur-seal coats, 1 black and 1 logwood brown, that had been used for display purposes. Each coat was made up of seven Pribilof Islands sealskins.

FOXES

The management of blue fox herds on St. Paul and St. George Islands is incidental to the fur-seal industry and requires attention at a time when sealing activities are light. Beginning about the first of December the animals are fed prepared rations and are trapped for their pelts.

During the 1934–35 season there were taken 184 blue and 16 white fox skins on St. Paul Island and 799 blue and 3 white skins on St. George Island, a total of 1,002. Eleven foxes on St. Paul Island and 266 on St. George Island were marked and released for breeding stock. The reserve includes also a considerable number of animals that were not caught in the traps.

In the fiscal year 1935 there were sold 914 blue fox skins, raw, for $21,935.50; 25 white fox skins, raw, for $333; 1 blue fox skin, dressed, for $38; and 1 white fox skin, dressed, for $24; a total of $22,330.50. The raw skins were taken on the Pribilof Islands in the 1933–34 season, and the dressed skins were of the 1932–33 season's take which had been used for exhibition purposes.

FUR-SEAL SKINS TAKEN BY NATIVES

Indians dwelling on the American coast of the North Pacific Ocean are privileged to engage in limited pelagic sealing under the provisions of the North Pacific Sealing Convention of 1911. The sealskins thus taken must be authenticated by Government officials before they can enter into commerce. In the 1934 season there were taken and duly authenticated by officials of the respective Governments 290 fur-seal skins, of which 23 were taken by Indians of Washington, 11 by Indians of southeast Alaska, and 256 by Indians of British Columbia. Reports have been received, also, of the authentication of 6 additional sealskins taken in 1933 by Indians of the State of Washington, making a total of 35 taken by them that year.

FUR-SEAL PATROL

A patrol for the protection of the fur seals was maintained by the United States Coast Guard, which detailed seven cutters and two 125-foot patrol vessels to this work in the calendar year 1934. Two vessels of the Bureau also participated successively in the patrol in the vicinity of Neah Bay, Wash., during the spring migration of the herd.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

Regulations issued on July 1, 1934, permit certain limited killing of walruses and sea lions in Alaska under specified conditions. The killing of sea otters is prohibited at all times.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

It is gratifying to report that a very moderate increase in the appropriation available for the propagation of food and game fishes resulted in a noticeable increase in output for the fiscal year 1935. The total distribution of fish and eggs, including fry hatched on a cooperative basis in State hatcheries, approximated 5,000,000,000 in comparison with an output of 3,258,000,000 for the previous year. The 1935 figures are still materially below the maximum output of several years ago which exceeded 7,000,000,000. To a considerable extent, this increase over the previous year was due to the resumption of the activities at the Gloucester (Mass.) station which propagates marine forms. Coupled with its increase there was a slight step-up in the output of some of the varieties, both game and commercial, handled at interior stations.

Of the hatcheries which were closed the previous year owing to economy requirements, those in Alaska and the two Michigan commercial hatcheries remained closed. The output of game fish was closely comparable to the production of these species in 1934.

The output of small mouth black bass, however, a variety most eagerly sought by the sportsmen, was almost twice the production of the previous year. There is no evidence of slackening in the demand for hatchery-produced game fish, and in fact the increased requirements for stocking areas now coming under the control of the Federal Government constitute a serious problem.

There was also a moderate increase in the output of fingerlings, constituting the larger fish with a greater stocking value. The distribution of these larger fish was approximately 4,000,000 greater than last year. The list of the species propagated was practically the same as during the previous year with the exception that no white perch were handled during 1935, but a considerable number of pollock was included in the figures for this year.

The sportsmen's organizations and the general public have largely accepted the requirement that they must themselves meet the cost of transporting the fish from the hatcheries. The problem of distribution has been further simplified by the readiness with which several State fish and game departments have undertaken to handle the fish produced at Federal hatcheries.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—An increase of approximately 1,400,000,000 in the output of cod, haddock, pollock, and winter flounder is to a large extent the result of the reopening of the Gloucester (Mass.) station. However, a large percentage of this increase is represented by eggs fertilized on the fishing boats and planted on the spawning grounds, since funds were not available for full-scale operation of the hatchery. The output of these marine forms represents between 85 and 90 percent of the total output, a ratio which is similar to the average over a number of years. No cod were propagated at the Woods Hole (Mass.) station during the year.

Pacific salmon.—While increases were registered for the output of silver and chum salmon, there was a slight decline in the distribution of chinook variety, and a very large decline in the production of sockeye salmon. This was due to negligible egg collections at the Quinault (Wash.) station, ordinarily the biggest producer of sockeyes since closure of the Alaska stations. The run of fish did not materialize, presumably on account of overfishing in previous years. The number of all species of Pacific salmon distributed in the fingerling stage compares very favorably with the record of previous years.

Anadromous species, Atlantic coast.—The production of shad was virtually the same as in 1934. An output of 860,000 Atlantic salmon in Maine was significantly larger than in the previous year when Canadian eggs were not obtainable. Land-locked salmon were produced in lesser numbers. An increase in output of yellow perch to 450,000,000 was derived from resumption of this activity at the Potomac River station at Fort Belvoir, Va.

Commercial species, interior waters.—Restriction on the activities of the hatcheries handling commercial species of the Great Lakes has continued. Consequently, the output of whitefish and lake trout has remained small, even though the production of whitefish was approximately four times the 1934 figure. The Put-in-Bay (Ohio) station again handled large numbers of pike perch, collecting over 500,000,000 eggs, the majority of which were incubated and distributed by the State. Two hatcheries in Michigan remained closed.

GAME SPECIES

As a whole, operations with the game species yielded satisfactory results. Inasmuch as some 15 species are included in this category, there were fluctuations among individual forms in comparison with last year's production. Special effort was made to augment the output of bass, owing to their high popularity in all parts of the country. It would be possible to increase the output of trout, particularly by distributing them at smaller sizes, but this would lower their stocking value. However, the problems surrounding the rearing of trout have been greatly intensified by the sharp increase in the price of food for fishes which became evident toward the close of the fiscal year.

RESCUE OPERATIONS

An increase in the amount appropriated for the administration of the Bureau's activities in the Upper Mississippi River Wild Life Refuge was reflected in a virtual doubling of the number of fish rescued. There was handled a total of 47,286,000 fish, comprising 10 species. This is still below the average number which can be rescued when funds are available to cover the entire territory where water conditions make the salvaging of fish trapped in land-locked areas an urgent need. Only 115,900 fish were distributed to other sections, the balance being returned directly to open waters.

AQUARIUM

The aquarium located under the main lobby in the Department of Commerce Building is maintaining its reputation as one of Washington's popular points of interest to visitors. The numerous organizations which gather for conventions in Washington, as a rule, include the aquarium in their itinerary of sight-seeing.

The general exhibits were maintained in much the same manner as during the previous year, and the display of trout has continued to be a point of particular interest. However, from time to time during the year it has been the practice to introduce more novel exhibits, one of which was the 500-pound green turtle. Another interesting novelty was a pair of Piranha—the small man-eating fish of the Amazon Basin.

The aquarium also was of great service in preparing and forwarding foreign shipments of live fish and eggs which were made to Cuba, Puerto Rico, Panama, and Venezuela.

As usual, the display of model hatching apparatus was kept in operation for the purpose of illustrating the methods followed in incubating various types of eggs.

MARKETING INVESTIGATIONS

Per capita consumption of fish.—A study made during the year indicates the domestic per capita consumption of fish amounted to 13.3 pounds in 1931. This is compared with a per capita consumption of meats amounting to 133.2 pounds in the same year.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, CALENDAR YEAR 1933

New England States.—During 1933 the commercial fisheries of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut employed 17,073 fishermen. Their catch amounted to 499,936,000 pounds, valued at $13,486,000, an increase of 4 percent in volume, but a decrease of 4 percent in value as compared with the catch in 1932. Landings of fish by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 267,157,000 pounds as landed, valued at $6,851,000—an increase of 6 percent in volume, and 13 percent in value, as compared with the preceding year.

Middle Atlantic States.—The commercial fisheries of New York, New Jersey, Pennsylvania, and Delaware in 1933 gave employment to 8,574 fishermen. Their catch amounted to 169,754,000 pounds, valued at $4,811,000—an increase of 20 percent in volume, and 3 percent in value as compared with 1932. Landings of fish at New York City during 1933 amounted to 25,455,000 pounds. The shad fishery on the Hudson River was conducted by 317 fishermen, who caught 519,000 pounds of shad, valued at $41,000—a decrease of 2 percent in volume and 20 percent in value as compared with 1931.

Chesapeake Bay States.—In 1933 the commercial fisheries of Maryland and Virginia employed 20,142 fishermen. Their catch amounted to 272,380,000 pounds, valued at $5,061,000—a decrease of 24 percent in volume and 14 percent in value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 651 fishermen, who caught 1,838,000 pounds of shad, valued at $149,000 and 6,896,000 pounds of alewives, valued at $24,000—a decrease of 19 percent in the catch of shad, but an increase of 1 percent in the catch of alewives.

South Atlantic and Gulf States.—No survey was made of the fisheries of this area for the year 1933.

Lake States.—No survey was made of the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, and Namakan and Rainy Lakes, and Lake of the Woods) for 1933.

Pacific Coast States.—The commercial fisheries of Washington, Oregon, and California in 1933 employed 18,673 fishermen. Their catch amounted to 860,161,000 pounds, valued at $13,988,000—an increase of 53 percent in volume and 47 percent in value, as compared with 1932. The total catch of halibut by United States and Canadian vessels amounted to 45,951,000 pounds, valued at $2,582,000—an increase of 6 percent in volume and 48 percent in value, as compared with the preceding year.

Mississippi River and tributaries.—No survey was made of this area in 1933.

MANUFACTURED PRODUCTS IN UNITED STATES AND ALASKA, CALENDAR YEAR 1933

Fresh and frozen packaged fishery products.—Based on the most recent data available, the domestic production of fresh and frozen packaged fishery products amounted to 129,608,000 pounds, valued at

$17,294,000. Important products in this group consist of fresh shucked oysters, 5,687,000 gallons, valued at $6,864,000; packaged haddock, 35,149,000 pounds, valued at $3,457,000; and fresh-cooked packaged crab meat, 6,864,000 pounds, valued at $1,662,000.

Frozen products.—The production of frozen fishery products in 1933 amounted to 95,874,000 pounds, estimated to be valued at about $8,006,000. The volume of the production was 4 percent greater than in 1932. The most important products frozen with respect to volume were ground fish, halibut, salmon, mackerel, whiting, and shellfish.

Cured products.—Based on the most recent data available, the domestic production of cured fishery products amounted to 104,310,000 pounds, valued at $12,823,000. Important products in this group were boneless cod, 9,517,000 pounds, valued at $1,646,000; and smoked salmon, 8,229,000 pounds, valued at $2,256,000.

Canned products.—Canned fishery products produced in 1933 amounted to 533,212,000 pounds, valued at $59,800,000—an increase of 37 percent in the value as compared with 1932. Canned salmon alone amounted to 305,398,000 pounds, valued at $36,242,000. Other important products were tuna and tunalike fishes, sardines, shrimp, mackerel, clam products, and oysters.

Byproducts.—During 1933 the value of the production of fishery byproducts amounted to $17,466,000—an increase of 40 percent as compared with the preceding year. Important products in this group consist of marine animal oils and meals, and aquatic shell products.

TECHNOLOGICAL INVESTIGATIONS

These investigations cover the general field of food technology as applied to fishery products. They involve the application of the sciences of chemistry, engineering, bacteriology, and general technology to the manufacture, preservation, and utilization of our fishery harvest. Chemical and bacteriological investigations dealing with the preservation of fishery products for food, the utilization of fishery byproducts, the nutritive value of aquatic products, and fish cookery investigations constituted the general scope of studies in fishery technology. Some of the outstanding accomplishments during the past year were: The development of methods for the home canning of some species of fish; increasing the practical value of and simplifying methods for determining the relative freshness of fish; the discovery of further facts concerning the high vitamin potency of fish oils and fish-liver oils; expansion of the possibilities for utilizing salmon cannery waste and other fish waste; discovery of further data on the role of the mineral constituents of fishery products in nutrition; and the issuance of a pamphlet on practical fish cookery.

Preservation of fishery products for food.—Studies in this field, in general, pertain to the chemistry and bacteriology of fish preservation and spoilage, the development of improved methods for handling fresh and frozen fish, studies on the smoking of fish, and the development of methods for canning fish in the home. During the past year, a better method for packing fresh mackerel for shipment was devised which is considered to be superior to the present commercial method of "floating." One difficulty encountered in the storage of frozen mackerel is the tendency of the oil or fat in the fish to become rancid, thereby making the mackerel unfit for use. Obviously, the intensity of rancidity is dependent upon the percentage of oil in the fish, which percentage is subject to considerable seasonal fluctuation, the maximum percentage occuring in August. Studies are being made to prevent or minimize this difficulty. A process was developed for smoking mackerel which produced a high quality product. This process has promise of commercial application and should be of aid in expanding the market for mackerel during periods of unusual abundance. Other studies revealed that losses of food value through leaching would be prevented if fish are covered with waterproof wrappers when packed in ice for shipment. Progress was made in developing a practical method for determining the relative freshness of cod, pollock, and mackerel under commercial conditions. A pamphlet was issued containing practical and tested methods for canning some species of fish in the home.

Bacteriological investigations.—Bacteriology plays a role in nearly all technological investigations of fishery products in that the various experimental products or methods are under bacteriological control. For instance, bacteriological examinations were made of the experimental packs of fish canned by the Bureau to determine which processes produced sterility, on the keeping quality of fresh mackerel packed in ice, in determining the preservative value of smoke, and on the tests developed for determining the relative freshness of fish. In addition, special bacteriological investigations were conducted for the development of disinfectants for sponges in household use and for determining the effect of antiseptics in ice on the keeping quality of fresh haddock when packed in such ice for temporary preservation.

Preservation of fishery byproducts.—The value of the Bureau's investigations in the field of fishery waste utilization has been very apparent during the past year. Studies with respect to the utilization of salmon cannery waste have demonstrated that valuable vitamin-active oils and a high quality edible oil can be recovered from this type of material by proper methods of preparation. The vitamin oils have been proved as desirable sources of fat soluble vitamins for poultry feeding and also as a new and reasonable source of these vitamins for human nutrition. The edible salmon oil may be added to canned salmon to improve both the nutritive value and appearance of the pack. Definite commercial application has been made of the results of the above study with advantage.

Studies on the manufacture of fish meal have demonstrated the possibility of producing materials of higher quality, and the fundamental information obtained in the course of these investigations has contributed much to a better understanding of the value of fish meals in animal feeding.

By investigation of the oil contained in swordfish livers, the Bureau discovered the richest known natural source of both vitamins A and D, and as a result of this work the fishing industry is obtaining additional revenue from the sale of livers which were formerly discarded. Swordfish-liver oils can be prepared that contain as high as 300,000 U. S. P. vitamin A units and 9,500 U. S. P. vitamin D units as compared to the minimum requirements for cod-liver oil of 600 vitamin A units and 95 vitamin D units. Besides giving added revenue to the fishing industry, these studies contributed to the domestic supply of vitamin-bearing materials.

Nutritive value of aquatic products.—Studies of the nutritive value of aquatic products during the past year included a determination of the vitamin content of swordfish-liver oils, salmon oils, and other fish and fish-liver oils extracted according to various experimental methods as previously discussed; a determination of vitamins A and G in crab meat, a study of the food value of sodium alginate, analyses of conch meat; and data on the role of the mineral constituents of fishery products in nutrition. In making these studies, our technologists made use of chemical methods and practical feeding tests with laboratory animals as well as biological tests with human subjects. Our investigations reveal that fish oils and fish-liver oils are of great potential sources of vitamins for both human and animal nutrition; that crab meat is a relatively good source of vitamins A and G; that sodium alginate is not only of value as a stabilizer in the preparation of dairy products, but that it has food value comparable to the kelp from which it is made; and that the mineral constituents found in fishery products and byproducts are of great importance in human and animal nutrition.

Fish cookery investigations.—During the past year, the Bureau established a fish cookery laboratory and developed by actual tests simple and practical recipes for the preparation and cooking of fish and shellfish. A very popular publication on practical fish cookery was issued and widely distributed by the Bureau, based on these recipes.

BLACK BASS AND ANGLERS DIVISION

The black-bass law was enforced by 2 regular field officers, 1 or 2 temporary employees, 1 permanent employee in the Washington office, and approximately 100 deputy black-bass-law inspectors who are regularly employed State fish and game protectors, and who serve the Federal Government without pay under the direction of the Chief of the Division. Several violations of the Federal black-bass law were found, but in only one instance was it necessary to report the case for prosecution in Federal court. Active field work has been conducted in well-known black-bass areas east of the Rocky Mountains, and fish markets of the principal cities have been inspected for illegal shipments. The Division receives the hearty cooperation of all the State authorities in those States where it functions.

During the year the legislatures of 44 States met in regular session, affording an opportunity to obtain much needed State legislation protecting black bass, without which the Federal law cannot be fully effective. Three States passed laws prohibiting the sale of black bass at all times, regardless of where taken, making a total of 37 States where these game fish are afforded this means of protection. One State adopted a closed season, leaving but 7 States that do not now protect the bass on the nest during at least a part of the spawning period. The closed season was also extended in several States.

Several States increased the size limit or decreased the daily limit on black bass; 6 States adopted a commission form of administering the State fish and game laws, and several increased the powers of the commission to promulgate regulations. Part-time nonresident tourist licenses were adopted in 8 States.

The adoption of all these measures was advocated by the Bureau in line with its policies for the protection and increase of the black bass.

Because of its administration of the Federal black-bass law, the Division is daily called upon for information about seasons, angler's licenses, and every subject pertaining to angling. Especially is it requested by letter, telephone, and personal call to advise the applicants, how, when, and where to fish. It has been necessary for the Division to prepare a number of small pamphlets, as follows: List of Books on Angling, List of State Fish Agencies, Compilation of Anglers Licenses Issued by the States and Revenue Derived Therefrom, Tabulation of the Laws Covering the Sale of Black Bass in the Various States, List of States that have Adopted the Part-Time Angler's License; and a leaflet entitled "Angling" which supplies many items of interest to the angler. There has been a large demand for all of these publications, which may be obtained only by applying to the Bureau of Fisheries.

Owing to the many changes in the game-fish laws in 1935, Fishery Circular No. 16 containing the game-fish laws for 1933–34 has been revised, and will be published early in the next fiscal year.

Twenty-seven permits for taking certain species of small fish in the District of Columbia for use as bait, have been issued in the Division during the year, a decrease of 11 over the last fiscal year.

VESSELS

Thirteen vessels of the Alaska service cruised about 116,000 nautical miles in the fiscal year 1935, as compared with 127,000 nautical miles by 15 vessels in the preceding year. The *Penguin* logged the greatest distance, with aproximately 27,700 miles; the *Brant* and *Teal* each covered about 13,300 miles; and the *Crane*, about 11,000 miles.

The *Penguin* made five round-trip voyages from Seattle to the Pribilof Islands, transporting personnel and emergency supplies. Supplies also were landed in the Aleutian Islands for the Navy Department and the Coast and Geodetic Survey.

The *Auklet*, *Kittiwake*, and *Teal* were engaged in fishery protective work in southeast Alaska during the 1934 season. The *Murre* operated in the Seward-Katalla district and the *Eider* in the Kodiak area. The *Scoter* patrolled the waters of Cook Inlet and in the fall, after the departure of the *Eider*, was assigned to the Kodiak area. The *Crane* and *Red Wing* were in the Alaska Peninsula region, and the *Blue Wing* was in Bristol Bay. After the close of the Bristol Bay season the *Blue Wing* assisted with the patrol in the Alaska Peninsula area and in southeast Alaska. As formerly, the *Ibis* was stationed at Chignik, and the *Coot* was on the Yukon River.

The *Widgeon* and *Petrel*, which were operated in southeast Alaska in the fiscal year 1934, were out of commission at Seattle.

The *Brant* was used in general supervisory work, chiefly in southeast Alaska, although two trips were made to Bristol Bay in western Alaska. Fur-seal patrol off Neah Bay, Wash., also was maintained by the *Brant*. A similar patrol in the vicinity of Sitka, Alaska, was carried on by the *Scoter*.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,325,327, as follows:

Salaries, Commissioner's office	$136, 600
Propagation of food fishes	570, 600
Maintenance of vessels	135, 380
Inquiry respecting food fishes	151, 214
Fishery industries	57, 125
Protecting seal and salmon fisheries of Alaska	245, 693
Upper Mississippi Wildlife and Fish Refuge	15, 000
Enforcement of black-bass law	13, 715
Total	[1] 1, 325, 327

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[1] Exclusive of indefinite deficiency appropriation of approximately $25,000 for restoration of salaries. Also exclusive of an appropriation of $100,000 for the fiscal year 1936 for oyster-pest control work, of which $50,000 was made available immediately following the approval of the act on Mar. 22, 1935.

U. S. GOVERNMENT PRINTING OFFICE: 1936

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1934[1]

By WARD T. BOWER, *Chief, Division of Alaska Fisheries*

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[1] Appendix I to the Report of the U. S. Commissioner of Fisheries for 1935. Approved for publication June 14, 1935.

INTRODUCTION

The Bureau's work in connection with the conservation of the fisheries of Alaska and the protection and management of the Pribilof Islands fur-seal herd was continued along the usual lines. An inspection of the fishery and fur-seal activities was again made by the Commissioner of Fisheries. The Secretary of Commerce also observed these activities in his tour of the Territory to survey the Department's work.

As the runs of salmon in general were satisfactory, comparatively few additional restrictions on commercial fishing were necessary during the season. Among the modifications of the regulations were those permitting limited commercial fishing for king salmon in the Yukon and Kuskokwim Rivers by residents of the locality, in accordance with provisions of an act of Congress of April 16, 1934.

Although some branches of the industry were adversely affected by the water-front strike on the Pacific coast and by fishermen's strikes in southeast Alaska and the Copper River area, the output of fishery products for the season showed a considerable gain, both in quantity and value, over that for 1933. A new record was set in the production of canned salmon, with a total pack of 7,481,830 cases, or 828,948 cases more than the previous record pack of 1926.

A patrol was maintained during the most active part of the fishing season, 164 temporary employees being identified with this work for varying periods, in addition to the regular employees and crews of the Bureau's patrol vessels. Effective use was made of chartered airplanes as a supplementary patrol, chiefly during the weekly closed periods, and for supervisory work and the inspection of spawning areas.

Life-history studies of the salmon and herring were continued. Weirs for counting the escapement of salmon to the spawning grounds were operated in 12 typical salmon streams. At several of these weirs attention was given to the destruction of trout that feed upon young salmon, and in the Bristol Bay region bounties were paid on predatory trout through funds provided by the Territory and by local packers.

Allotments by the Public Works Administration for reestablishing weirs, overhauling and repairing Alaska vessels, and reconditioning and repairing buildings at the Pribilof Islands were of material assistance in furthering the Bureau's work. A stream-clearing project to improve salmon-spawning conditions in southeast Alaska was made possible by the Civil Works Administration and gave temporary employment to approximately 200 persons during the winter.

Sealing activities at the Pribilof Islands resulted in the take of 53,468 fur-seal skins. Killings were confined as far as possible to 3-year-old male seals, and sufficient animals of this age class were reserved for future breeding stock. A computation of the fur-seal herd as of August 10, 1934, showed 1,430,418 animals of all classes, or an increase of 8.48 percent over the previous year.

Attention was given to the feeding and care of blue-fox herds on St. Paul and St. George Islands during the winter, and 983 blue and 19 white-fox skins were taken on the two islands in the 1934–35 season.

Some permanent improvements were made at the islands in the way of new buildings and extensions of surfaced roads to expedite the fur-seal work.

Valuable assistance was rendered by the Navy Department in detailing the U. S. S. *Sirius* to transport the annual shipment of supplies to the Pribilof Islands and to bring out the season's take of sealskins. The United States Coast Guard also rendered important service in maintaining a patrol of the fur seals along the Pacific coast during the northward migration and in Bering Sea throughout the breeding season.

Acknowledgment is made of the assistance rendered by members of the Bureau's staff in the preparation of this document.

VISIT OF THE SECRETARY OF COMMERCE AND OTHER OFFICIALS TO ALASKA

Secretary of Commerce Daniel C. Roper made a detailed investigation of Department of Commerce activities in Alaska in 1934. Departure from Seattle was made on board the Coast Guard cutter *Shoshone* on June 25. All the principal points in southeast, central, and western Alaska were visited, and a brief stop was made at the Pribilof Islands. The return voyage from Dutch Harbor to Seattle was made on the Coast Guard cutter *Tahoe*.

Commissioner Bell was in Alaska during much of the active salmon-fishing season in the summer of 1934, giving personal attention to the conservation needs of the industry. Visits were made to all the important fishing districts throughout the Territory, and conferences with fishermen and operators of canneries and other fishery establishments were held at various places. A trip was also made to the Pribilof Islands to observe the activities there.

Much of this inspection trip was made aboard the Bureau's vessel *Brant*, although some travel occurred on the *Penguin*, and on the Coast Guard cutter *Shoshone*. A number of extended airplane flights were made to reach some of the more inaccessible places, thus saving considerable time and making possible a more extensive inspection of the fisheries.

Commissioner Bell returned to Washington on August 18.

Second Assistant Postmaster General Harllee Branch was furnished transportation to southeast Alaska on the *Penguin*, sailing from Seattle on August 25. Julian W. Blount, secretary to Senator Peter Norbeck, likewise was a passenger on the vessel at that time, making the round trip from Seattle to the Pribilof Islands.

Through an oversight the visit of United States Senator Arthur R. Robinson, of Indiana, to the Pribilof Islands in 1933 was omitted from the corresponding report for that year. Senator Robinson was at St. Paul Island on July 8, 1933, observing sealing operations. Transportation to the Pribilofs was afforded by the U. S. Coast Guard cutter *Chelan*.

PROTECTION OF WALRUSES AND SEA LIONS

A new (seventh) edition of Department of Commerce Circular No. 286 was issued under date of July 1, 1934, containing the laws and regulations for the protection of walruses and sea lions in Alaska. The regulation governing the killing of walruses is as follows:

> The killing of walruses in the Territory of Alaska or in any of the waters of Alaska over which the United States has jurisdiction is prohibited from July 1, 1934, to June 30, 1936, both dates inclusive. This prohibition shall not apply

to the killing of walruses by natives for food or clothing, by miners or explorers when in need of food, or to the collection of specimens for scientific purposes under permits issued by the Secretary of Commerce.

On June 16, 1934, an act was passed pertaining to the killing of sea lions in Alaska waters, the text of which is as follows:

> *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all acts and parts of acts making it unlawful to kill sea lions, as game animals or otherwise, in the waters of the Territory of Alaska are repealed: *Provided, however,* That sea lions shall not be killed in the waters of Alaska except under such rules and regulations as the Secretary of Commerce may prescribe, in order to prevent the extinction of sea lions as a species of interesting sea life in the waters of Alaska.

The following departmental regulations governing the killing of sea lions in the waters of Alaska were made effective on July 1, 1934:

> The killing of sea lions in the Territory of Alaska, or in any of the waters of Alaska over which the United States has jurisdiction, is permitted as follows:
>
> 1. (*a*) By natives for food or clothing, and by miners or explorers when in need of food.
>
> (*b*) By anyone in the necessary protection of property, or while such animals are destroying salmon or other food fish.
>
> 2. The killing of sea lions as specimens for scientific purposes will be under permits issued by the Secretary of Commerce.

PUBLIC WORKS PROJECTS

Allotments to the Bureau by the Public Works Administration in the fiscal year 1934 included $29,000 for projects having to do with the Alaska service. Of this amount, $20,000 was for reconditioning and repairing 12 Alaska vessels, $3,000 for reconditioning and repairing buildings at the Pribilof Islands, and $6,000 for reestablishing weirs to tally escapements of spawning salmon. These funds helped materially to further the Bureau's program for the conservation of the fisheries and the management of the fur-seal industry. A part of the allotment for weirs was carried over for reestablishing the structures in 1935.

CIVIL WORKS PROJECT

Under date of December 6, 1933, the Department was notified of the approval of the Civil Works project for the improvement of salmon spawning streams in southeast Alaska. The Territorial Civil Works Administrator was authorized to furnish 198 unskilled laborers for this work. Operations were under the supervision of three regular employees of the Bureau of Fisheries in the Alaska field service. A report of the work accomplished is included under the section regarding stream improvement.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects of special investigation or inquiry.

ALASKA FISHERIES LEGISLATION

On April 16, 1934, the President approved an act amending the Fisheries Act of June 26, 1906, as amended by the act of June 6, 1924. This modification permits commercial fishing for king salmon in the Yukon and Kuskokwim Rivers by native Indians and bona fide permanent white inhabitants under such restrictions as may be specified by the Secretary of Commerce. Prior to the enactment of this measure all commercial fishing was prohibited in the Yukon and Kuskokwim Rivers and within 500 yards of their mouths. The text of the amendment is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 3 of the act of Congress entitled "An act for the protection and regulation of the fisheries of Alaska", approved June 26, 1906, as amended by the act of Congress entitled "An act for the protection of the fisheries of Alaska, and for other purposes", approved June 6, 1924, be, and the same is hereby, amended to read as follows:

"Sec. 3. That it shall be unlawful to erect or maintain any dam, barricade, fence, trap, fishwheel, or other fixed or stationary obstruction except for purposes of fish culture, in any of the waters of Alaska at any point where the distance from shore to shore is less than one thousand feet, or within five hundred yards of the mouth of any creek, stream, or river into which salmon run, excepting the Karluk, Ugashik, Kuskokwim, and Yukon Rivers, with the purpose or result of capturing salmon or preventing or impeding their ascent to the spawning grounds, and the Secretary of Commerce is hereby authorized and directed to have any and all such unlawful obstructions removed or destroyed: *Provided, however*, That the exception hereinabove contained with reference to the Kuskokwim and Yukon Rivers shall be solely for the purpose of enabling native Indians and bona fide permanent white inhabitants along the said rivers to take from said rivers for commercial purposes and for export from the Territory of Alaska king salmon in such manner and such quantities, and at such times as the Secretary of Commerce may, by suitable regulations, from time to time permit: *Provided further*, That no person shall be deemed to be a bona fide permanent inhabitant of the said rivers who has not resided thereon, or within fifty miles thereof for a period of over one year, and that the term 'native Indians' as used herein shall be taken to mean members of the aboriginal races inhabiting Alaska when annexed to the United States, and their descendants of the whole or half blood. For the purposes of this section, the mouth of such creek, stream, or river shall be taken to be the point determined as such mouth by the Secretary of Commerce and marked in accordance with this determination. It shall be unlawful to lay or set any seine or net of any kind within one hundred yards of any other seine, net, or other fishing appliance which is being or which has been laid or set in any of the waters of Alaska, or to drive or to construct any trap or any other fixed fishing appliance within six hundred yards laterally or within one hundred yards endwise of any other trap or fixed fishing appliance."

Sec. 2. That section 4 of the act of Congress entitled "An Act for the protection and regulation of the fisheries of Alaska", approved June 26, 1906, as amended by the act of Congress entitled "An Act for the protection of the fisheries of Alaska, and for other purposes", approved June 6, 1924, be, and the same hereby is, amended to read as follows:

"Sec. 4. That it shall be unlawful to fish for, take, or kill any salmon of any species or by any means except by hand rod, spear, or gaff in any of the creeks, streams, or rivers of Alaska; or within five hundred yards of the mouth of any such creek, stream, or river over which the United States has jurisdiction, excepting the Karluk, Ugashik, Yukon, and Kuskokwim Rivers: *Provided*, That nothing herein contained shall prevent the taking of fish for local food requirements or for use as dog feed: *Provided further*, That the exception hereinabove contained with reference to the Kuskokwim and Yukon Rivers shall be solely for the purpose of enabling native Indians and bona fide permanent white inhabitants along the said rivers to take from said rivers for commercial purposes and for export from the Territory of Alaska king salmon in such manner and such quantities, and at such times as the Secretary of Commerce may, by suitable regulations, from time to time permit: *Provided further*, That no person shall be deemed to be a bona fide permanent inhabitant of said rivers who has not resided thereon or within fifty miles thereof for a period of over one year, and that the term 'native Indians' as used herein shall be taken to mean members of the aboriginal races inhabiting Alaska when annexed to the United States, and their descendants of the whole or half blood."

Approved April 16, 1934.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued December 21, 1933, were amended by the following regulations issued by the Acting Secretary of Commerce under the dates indicated:

[*February 1, 1934*]

Alaska Peninsula Area

Salmon fishery.—1. Regulation No. 21 (*n*) is amended to read as follows: Unga Island: North and east coasts (1) within 2,500 feet of a point at 55 degrees 24 minutes 15 seconds north latitude, 160 degrees 41 minutes 24 seconds west longitude, (2) within 2,500 feet of a point at 55 degrees 11 minutes 42 seconds north latitude, 160 degrees 27 minutes 38 seconds west longitude, and (3) within 2,500 feet of a point at 55 degrees 13 minutes 29 seconds north latitude, 160 degrees 29 minutes 37 seconds west longitude.

2. Regulation No. 21 (*p*) is amended to read as follows: (1) Within 5,000 feet of a point on a reef near Guillemot Island at 55 degrees 33 minutes 10 seconds north latitude, 160 degrees 25 minutes 17 seconds west longitude, (2) within 1,000 feet of a point on Korovin Island at 55 degrees 24 minutes 24 seconds north latitude, 160 degrees 8 minutes 57 seconds west longitude, and (3) within 2,500 feet of a point on Nagai Island at 55 degrees 15 minutes 47 seconds north latitude, 159 degrees 54 minutes 46 seconds west longitude.

Kodiak Area

Salmon fishery.—1. Regulation No. 14 (*h*) is amended to read as follows: Kodiak Island: (1) Within 2,500 feet of a point on the west side of Uganik Bay at 57 degrees 50 minutes 45 seconds north latitude, 153 degrees 38 minutes west longitude, and (2) within 5,000 feet easterly of a point at 57 degrees 52 minutes 5 seconds north latitude, 153 degrees 51 minutes 9 seconds west longitude.

2. Regulation No. 14 (*k*) is amended to read as follows: Kodiak Island: (1) Within 2,500 feet of a point on the east side of Uyak Bay at 57 degrees 35 minutes 40 seconds north latitude, 153 degrees 49 minutes 30 seconds west longitude, and (2) within 2,500 feet of a point northwest of Cape Uyak at 57 degrees 38 minutes 6 seconds north latitude, 154 degrees 20 minutes 3 seconds west longitude.

Prince William Sound Area

Salmon fishery.—1. Regulation No. 12 (*a*) is amended to read as follows: Knight Island: From a point on the southeast coast at 60 degrees 9 minutes 50 seconds north latitude southerly to Point Helen, thence northerly to 60 degrees 11 minutes 15 seconds north latitude, 147 degrees 50 minutes 40 seconds west longitude, exclusive of all waters in Little Bay.

2. Regulation No. 12 (*e*) is amended to read as follows: Eastern coast of Culross Island: From the northern side of the entrance to Hidden Bay northerly to a point at 60 degrees 43 minutes 45 seconds north latitude, 148 degrees 6 minutes 35 seconds west longitude.

3. Regulation No. 12 (*g*) is amended to read as follows: Along the mainland coast within 1 statute mile easterly from the outermost extremity of Point Pellew.

4. Regulation No. 12 (*cc*) is amended to read as follows: Montague Island: Northern coast (1) from Graveyard Point to a point at 60 degrees 21 minutes 41 seconds north latitude, 147 degrees 9 minutes 47 seconds west longitude, and (2) within 2,500 feet of a point on the southeast side of Zaikof Bay at 60 degrees 17 minutes 40 seconds north latitude, 146 degrees 59 minutes west longitude.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—1. Regulation No. 14 (*b*) is amended to read as follows: Along the coast (1) within 2,500 feet of a point at 58 degrees 16 minutes 18 seconds north latitude, 136 degrees 20 minutes 27 seconds west longitude, (2) from a point on the east coast of the northwestern island at 58 degrees 15 minutes 50 seconds north latitude, northwesterly to the northernmost point of the island, thence southerly to a point at 58 degrees 15 minutes 26 seconds north latitude, and (3) within 1,000 feet of a point at 58 degrees 14 minutes 9 seconds north latitude, 136 degrees 20 minutes 6 seconds west longitude.

2. Regulation No. 14 (*l*) is amended to read as follows: Chichagof Island: Northeastern coast (1) within 2,500 feet of a point at 58 degrees 8 minutes 40 seconds north latitude, 135 degrees 23 minutes 59 seconds west longitude, (2) from 135 degrees 20 minutes west longitude to 135 degrees 11 minutes 11 seconds west longitude, and (3) within 2,500 feet of a point at 58 degrees 5 minutes 20 seconds north latitude, 135 degrees 9 minutes 29 seconds west longitude.

WESTERN DISTRICT

Salmon fishery.—1. Regulation No. 20 (*e*) is amended to read as follows: Chichagof Island: East coast (1) from 57 degrees 48 minutes 45 seconds north latitude to 57 degrees 48 minutes 18 seconds north latitude, (2) from 57 degrees 45 minutes north latitude to 57 degrees 42 minutes 40 seconds north latitude, (3) from 57 degrees 36 minutes 30 seconds north latitude to 57 degrees 34 minutes north latitude, and (4) from 57 degrees 29 minutes 30 seconds north latitude to Point Hayes.

2. Regulation No. 20 (*k*) is amended to read as follows: Mansfield Peninsula: West coast (1) from the south point of entrance to Funter Bay to 58 degrees 10 minutes 45 seconds north latitude, and (2) from 58 degrees 9 minutes 30 seconds north latitude to the southern extremity of the peninsula at the north side of the entrance to Hawk Inlet.

3. Regulation No. 20 (*l*) is amended to read as follows: Admiralty Island: West coast (1) from a point ¾ statute mile north of Parker Point to 57 degrees 45 minutes north latitude, (2) from 57 degrees 49 minutes 55 seconds north latitude to 57 degrees 51 minutes north latitude, (3) from 57 degrees 54 minutes 45 seconds north latitude to 57 degrees 56 minutes 20 seconds north latitude, and (4) from 57 degrees 57 minutes 50 seconds north latitude to 58 degrees 2 minutes north latitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 16 (*n*) is amended to read as follows: (1) Kuiu Island: East coast of peninsula between Port Beauclerc and Reid Bay from 56 degrees 18 minutes 30 seconds north latitude northward to 56 degrees 19 minutes north latitude, and (2) unnamed island east of Kuiu Island: Within 2,500 feet measured along the east coast from a point at 56 degrees 28 minutes 30 seconds north latitude, 133 degrees 50 minutes 50 seconds west longitude.

2. Regulation No. 16 (*s*) is amended to read as follows: (1) Kupreanof Island: Southern coast within 2,500 feet of a point at 56 degrees 26 minutes 8 seconds north latitude, 133 degrees 29 minutes 35 seconds west longitude, and (2) Zarembo Island: Southwest coast within 2,500 feet of a point at 56 degrees 15 minutes north latitude, 132 degrees 53 minutes 30 seconds west longitude.

3. Regulation No. 16 (*cc*) is amended to read as follows: Prince of Wales Island: East coast from a point at 55 degrees 48 minutes 35 seconds north latitude southerly to a point at 55 degrees 46 minutes 45 seconds north latitude.

4. Regulation No. 16 (*gg*) is amended to read as follows: Cleveland Peninsula: (1) South side of Ernest Sound within 1,500 feet of a point on the northwestern extremity of Union Point at 55 degrees 48 minutes 10 seconds north latitude, 132 degrees 11 minutes west longitude, and (2) east side of Clarence Strait within 2,000 feet southerly of a point at 55 degrees 45 minutes 48 seconds north latitude, 132 degrees 17 minutes 5 seconds west longitude.

5. Regulation No. 16 (*jj*) is amended to read as follows: Gravina Island: West coast (1) from South Vallenar Point to 55 degrees 20 minutes 48 seconds north latitude, and (2) from 55 degrees 18 minutes 50 seconds north latitude to 55 degrees 8 minutes 15 seconds north latitude, including the Bronaugh Islands and rocky islets adjacent to this coast.

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 13 (*i*) is amended to read as follows: Prince of Wales Island: West coast (1) within 2,500 feet of a point at 55 degrees 2 minutes 20 seconds north latitude, 132 degrees 35 minutes 18 seconds west longitude, and (2) from Point Webster southeasterly to 54 degrees 55 minutes 52 seconds north latitude, 132 degrees 32 minutes 30 seconds west longitude.

2. Regulation No. 13 (*j*) is amended to read as follows: Along the coast (1) within 900 feet west of the southern extremity of the eastern large island of the Ship Islands group at 54 degrees 53 minutes 42 seconds north latitude, 132 degrees 30 minutes 21 seconds west longitude, and (2) within 2,500 feet of a point on a small island near the entrance to Ruth Bay at 54 degrees 53 minutes 40 seconds north latitude, 132 degrees 26 minutes 27 seconds west longitude.

ICY STRAIT, WESTERN, EASTERN, NORTH PRINCE OF WALES ISLAND, SOUTH PRINCE OF WALES ISLAND, AND SOUTHERN DISTRICTS

Salmon fishery.—Regulation No. 4 is amended to read as follows: No floating trap shall exceed 900 feet in length when any part of such trap is in a greater depth of water than 100 feet at mean high tide. The length of any such trap shall be as measured along the lead from shore at mean high tide to the outer face of the pot.

[*March 17, 1934*]

SOUTHEASTERN ALASKA AREA

Shrimp fishery.—Commercial fishing for shrimps is prohibited in the period from March 20 to April 30, both dates inclusive, in each year.

[*June 4, 1934*]

YUKON-KUSKOKWIM AREA

Salmon fishery.—1. Regulation No. 1 (*a*) is amended to read as follows: Port Clarence district: Waters within a line extending from Cape Douglas to Cape York.

2. Regulation No. 1 (*b*) is amended to read as follows: Yukon district: All waters of the Yukon River and all waters along the coast between 62 degrees north latitude and 63 degrees 15 minutes north latitude.

3. Regulation No. 1 (*c*) is amended to read as follows: Kuskokwim district: All waters of Kuskokwim River, and waters of Kuskokwim Bay, exclusive of Goodnews Bay, within a line extending from the east shore of Kuskokwim Bay at the parallel of 59 degrees north latitude to Cape Avinof. The mouth of the Kuskokwim River shall be considered as at a straight line extending from a marker erected for the purpose at Beacon Point to another marker at Popokamute.

4. Regulation No. 2 is amended to read as follows: Commercial fishing for salmon shall be conducted solely by drift gill nets and set nets: *Provided*, That this shall not apply (*a*) to the use of purse seines in Kuskokwim Bay, exclusive of Goodnews Bay, between 59 degrees north latitude and 59 degrees 40 minutes north latitude westward to Cape Avinof, and (*b*) to the use of fish wheels in the Yukon and Kuskokwim Rivers by native Indians and bona fide permanent white residents along those rivers for the capture of king salmon.

5. Regulation No. 5 is amended to read as follows: Commercial fishing for salmon in the Yukon district shall be conducted solely by king-salmon gill nets having mesh of at least 8½ inches stretched measure between knots as measured when actually in use: *Provided*, That this shall not apply to the use of fish wheels in the Yukon River by native Indians and bona fide permanent white residents along the river for the capture of king salmon.

6. Regulation No. 6 is amended to read as follows: Commercial fishing for salmon is prohibited except in the period from 6 o'clock antemeridian June 1 to 6 o'clock postmeridian July 31, in each year.

7. Regulation No. 7 is amended to read as follows: The combined take of king and red salmon for commercial purposes shall not exceed 350,000 fish in any calendar year: *Provided*, That the take of king salmon in the Yukon district shall not exceed 100,000 fish, of which not more than 50,000 may be taken outside of the mouth of the Yukon River, in any calendar year: *And provided further*, That the combined take of red and king salmon in the Kuskokwim district shall not exceed 250,000 fish in any calendar year.

ALASKA PENINSULA AREA

Salmon fishery.—1. Regulation No. 2 is amended to read as follows: In the waters along the south side of the Alaska Peninsula, including the waters of the Shumagin and other adjacent islands, the 36-hour closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the periods from 6 o'clock postmeridian Tuesday to 6 o'clock antemeridian Wednesday and from 6 o'clock postmeridian Wednesday to 6 o'clock antemeridian Thursday of each week making a weekly closed period of 60 hours: *Provided*, That this extension of 24 hours' closed period each week shall not be effective after 6 o'clock antemeridian of July 25 of each year.

2. Regulation No. 14 prohibiting commercial fishing for salmon prior to July 15 along the coast from the west side of the entrance to Sankin Bay to Morgan Point is revoked.

3. Regulation No. 15 prohibiting commercial fishing for salmon prior to July 1 along the coast from a point 1 statute mile northwest of Moss Cape to Castle Cape is revoked.

4. Regulation No. 16 prohibiting commercial fishing for salmon, except by beach seines, in the waters between Cape Tachilni and Bold Cape and between Cape Tolstoi and Kupreanof Point is revoked.

ALEUTIAN ISLANDS AREA

Herring fishery.—1. Commercial fishing for herring, except for bait purposes, by means of any seine is prohibited except in the period from July 15 to October 31, both dates inclusive.

2. Regulation No. 5 is amended to read as follows: Commercial fishing for herring, except for bait purposes, by means of any seine is prohibited west of 166 degrees west longitude.

3. Regulation No. 6 is amended to read as follows: Commercial fishing for herring, including bait fishing, by means of any purse seine more than 1,400 meshes in depth, more than 180 fathoms in length, or of mesh less than 1½ inches stretched measure between knots is prohibited.

KODIAK AREA

Salmon fishery.—1. Regulation No. 11 is amended to read as follows: Commercial fishing for salmon between Cape Karluk and Cape Uyak except by beach seines and purse seines is prohibited.

2. Regulation No. 12 is amended to read as follows: Commercial fishing for salmon is prohibited from August 15 to August 31, both dates inclusive: *Provided*, That this prohibition shall not apply (1) to beach seines and purse seines on the north coast of Kodiak Island from Cape Karluk to Cape Uyak, (2) to set gill nets on the north coast of Kodiak Island from Cape Uyak to West Point, and (3) to traps on the west coast of Kodiak Island from Cape Uyak to Uyak Post Office, and from Chief Point to West Point.

3. Regulation No. 15 (*p*) is amended to read as follows: Kaflia Bay, on north shore of Shelikof Strait: All waters within 1 statute mile outside the entrance of the outer lagoon.

COOK INLET AREA

Salmon fishery.—1. Regulation No. 1 is amended so as to permit commercial fishing for salmon south of the latitude of Anchor Point, except in Chinik Inlet and Kamishak Bay south of 59 degrees 9 minutes north latitude, until 6 o'clock postmeridian August 10.

2. Regulation No. 9 is amended to read as follows: No set or anchored gill net shall exceed 35 fathoms in length measured on the cork line.

3. Regulation No. 10 is amended to read as follows: Stake and set or anchored gill nets shall be operated in substantially a straight line: *Provided*, That not to exceed 20 yards of each net may be used as a hook. Only one such hook is permitted on a net.

4. Regulation No. 15 (*q*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet within 1,200 feet of a point on the west side of Nubble Point Spit at 59 degrees 28 minutes 45 seconds north latitude, 151 degrees 35 minutes 6 seconds west longitude.

RESURRECTION BAY AREA

Salmon fishery.—1. Regulation No. 6 is amended to read as follows: Prior to 6 o'clock antemeridian June 4 in each year commercial fishing for salmon with nets of mesh less than 8½ inches stretched measure between knots is prohibited.

2. Regulation No. 8 is amended to read as follows: In the waters of Resurrection Bay within a line from Cape Resurrection to the western side of Bear Glacier at its mouth, the 36-hour closed period for salmon fishing prescribed by section 5 of the Act of June 6, 1924, is hereby extended to include the period from 6 o'clock antemeridian of Saturday of each week until 6 o'clock antemeridian of the Monday following, making a weekly closed period of 48 hours: *Provided*, That this extension shall not be effective after August 23 in each year.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—1. Regulation No. 6 is amended so as to permit commercial fishing for salmon, except by means of traps, in the period from 6 o'clock antemeridian October 1 to 6 o'clock postmeridian October 15.

2. Regulation No. 16 is amended to read as follows: All commercial fishing for salmon is prohibited in Glacier Bay north of 58 degrees 27 minutes 54 seconds north latitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 6 is amended to read as follows:

(*a*) Commercial fishing for salmon, other than trolling, is prohibited in all waters of the district off the west and north coasts of Prince of Wales Island, and in the waters north and east of a line extending from Union Point to the southern extremity of Ernest Point, thence northerly to a point on Etolin Island at 55 degrees 54 minutes 45 seconds north latitude, 132 degrees 21 minutes west longitude, thence northerly and westerly along the watershed of Etolin Island to a point northwest of the head of Mosman Inlet at 56 degrees 9 minutes 45 seconds north latitude, 132 degrees 37 minutes 15 seconds west longitude, thence southerly to a point at 56 degrees 6 minutes north latitude, 132 degrees 37 minutes 15 seconds west longitude, thence in a northerly direction along the watershed to the northern extremity of Point Harrington, thence in a westerly direction to the northern extremity of East Island, thence to the southern extremity of West Island, and thence to a point on the east coast of Prince of Wales Island at 56 degrees 9 minutes 15 seconds north latitude, 133 degrees 2 minutes 45 seconds west longitude, prior to 6 o'clock antemeridian July 10, from 6 o'clock postmeridian August 22 to 6 o'clock antemeridian October 1, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

(*b*) Commercial fishing for salmon, other than trolling, is prohibited in all waters between a line extending from the northern extremity of Point Harrington to the northern extremity of East Island, thence to the southern extremity of West Island, and thence to a point on the east coast of Prince of Wales Island at 56 degrees 9 minutes 15 seconds north latitude, 133 degrees 2 minutes 45 seconds west longitude, and a line extending from Narrow Point to Ernest Point prior to 6 o'clock antemeridian July 15, from 6 o'clock postmeridian August 28 to 6 o'clock antemeridian October 1, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

(*c*) Commercial fishing for salmon, other than trolling, is prohibited in all waters between a line extending from Narrow Point to Ernest Point, thence to Union Point and a line extending from Approach Point to Caamano Point prior to 6 o'clock antemeridian July 15, from 6 o'clock postmeridian August 25 to 6 o'clock antemeridian October 1, and for the remainder of each calendar year after October 15.

(*d*) Commercial fishing for salmon, other than trolling, is prohibited in all waters south of a line extending from Approach Point to Caamano Point, including all waters of Kasaan Bay, prior to 6 o'clock antemeridian July 10, from 6 o'clock postmeridian August 22 to 6 o'clock antemeridian October 1, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

2. Regulation No. 7 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited in the period from 6 o'clock antemeridian October 1 to 6 o'clock postmeridian October 15.

3. Regulation No. 16 (*aa*) is amended to read as follows: Prince of Wales Island: East coast from a point ½ statute mile northwest of Luck Point to 55 degrees 55 minutes 20 seconds north latitude, exclusive of 1 statute mile each side of the mouth of Eagle Creek.

4. Regulation No. 16 (*cc*) as modified by supplement No. 251-20-1 is amended to read as follows: Prince of Wales Island: East coast from a point at 55 degrees 47 minutes 35 seconds north latitude southerly to a point at 55 degrees 46 minutes 45 seconds north latitude.

5. Regulation No. 16 (*pp*) is amended so as to prohibit the operation of any trap along the east coast of Prince of Wales Island from 55 degrees 36 minutes 5 seconds north latitude to 55 degrees 37 minutes 5 seconds north latitude.

SOUTHEASTERN ALASKA AREA

Herring fishery.—Regulation No. 3 is amended to read as follows: All commercial fishing for herring, including bait fishing, is prohibited, as follows: All waters of Chatham Strait and contiguous waters along the western shore of Admiralty Island between Point Gardner and Marble Bluffs: *Provided*, That this prohibition shall not apply (a) to commercial fishing for herring, including bait fishing, by means of gill nets of mesh not less than 2½ inches stretched measure between knots in the period from June 1 to December 31, both dates inclusive, and (b) to the taking of herring for bait by salmon trolling boats by means of any gill net of mesh not more than 2½ inches stretched measure between knots, of not greater than No. 20 gill net thread, and not exceeding 10 fathoms in length and 100 meshes in depth.

GENERAL REGULATIONS

Regulation No. 6 is amended so as to permit commercial fishing for flounders by means of any trawl when such fishing does not result in the capture, injury, or destruction of other food fish.

[*July 2, 1934*]

BRISTOL BAY AREA

Salmon fishery.—1. In addition to existing prohibitions, commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited on Wednesday of each week from 4 o'clock antemeridian to 6 o'clock antemeridian, in the period prior to 6 o'clock antemeridian August 3.

2. In addition to existing prohibitions, commercial fishing for salmon in the Ugashik district, which includes the coastal waters from a point 3 statute miles north of Cape Greig to a point on the coast 3 statute miles south of Cape Menshikof, is prohibited from 10 o'clock antemeridian of Tuesday of each week to 6 o'clock antemeridian of Wednesday of each week, in the period prior to 6 o'clock antemeridian August 3.

[*July 7, 1934*]

COPPER RIVER AREA

Salmon fishery.—Regulation No. 1 is amended so as to permit commercial fishing for salmon from 6 o'clock antemeridian July 10 to 6 o'clock postmeridian July 28.

Revised regulations effective in 1935 for the protection of the fisheries of Alaska were issued by the Secretary of Commerce under date of January 19, 1935, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

ANNETTE ISLAND FISHERY RESERVE

The Annette Island Canning Co. again operated in the Annette Island Fishery Reserve under its lease from the Department of the Interior.

In 1934 the company operated 8 traps within the reservation, the catch of which totaled 1,653,347 salmon, and 1,738 salmon taken in seines and gill nets were purchased from the natives. In addition, 640,114 salmon taken in purse seines outside the reserve were purchased. Except for 47,308 salmon that were sold to other companies, the entire catch was packed at the cannery. In the operation of the plant and the fish traps employment was given to 20 whites, 182 natives, and 2 Chinese.

Profits to the Metlakatlan Indians of the reserve on the cannery operations for the year 1933 under the provisions of the lease amounted to approximately $37,000. Preliminary estimates for the year 1934 place the figure at about $50,000.

STREAM IMPROVEMENT

The reclaiming of former spawning areas that have become inaccessible to the salmon by reason of an accumulation of debris from slides and windfalls is of recognized importance in the conservation of the fisheries. Some work of this kind is accomplished from time to time by Bureau employees in connection with patrol duties, but it is necessarily limited by the amount of funds available.

In 1934 an extensive program of stream improvement in southeastern Alaska was undertaken as a project of the Civil Works Administration. The work was under the direction of three regular employees of the Bureau and was participated in by approximately 200 persons for varying periods. It was carried on throughout the first 4 months of the year, in which time 468 streams were cleared for a distance of 621 miles, and more than 100 miles of trail were cut to facilitate making surveys of the spawning beds. Expenditures for this work amounted to approximately $35,000 for pay rolls of temporary employees, and $2,660 for miscellaneous supplies, including gas and oil for the operation of power boats.

The fishway in Ketchikan Creek was reconstructed and improved, the work being started under the C. W. A. project and completed by the Bureau. By means of this structure the salmon are able to ascend to the spawning grounds above the falls without difficulty.

Other work to increase the returns from the spawning escapement included the destruction of trout that feed upon salmon eggs and fingerlings. This work was carried on throughout the winter of 1934–35 in the Bristol Bay region, where a bounty of 2½ cents each was paid on predatory trout taken by bona fide residents of Alaska. Payments were made from an appropriation for the purpose by the Territorial legislature at its 1933 session and from funds contributed by Bristol Bay packers interested in securing a maximum production from the salmon-breeding reserve. In the Yakutat district, also, considerable work was accomplished in clearing streams and destroying predatory trout through funds supplied by one of the canning companies. Captures of trout were made likewise by weir crews, particularly in the Kodiak area.

STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

STREAM GUARDS

The Bureau employed 164 men in 1934 as stream guards, weir operators, and special workmen in connection with law-enforcement duties. Of these, 81 were stationed in southeastern Alaska, 56 in central, and 27 in western Alaska. Some of the workers were engaged for only a few days, but the average period of employment ranged from 2 to 5 months.

In southeastern Alaska 48 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 14 guards were stationed in the Seward-Katalla district, 10 on Cook Inlet, 21 in the Kodiak-Afognak district, 4 at Chignik, and 7 in the Ikatan-Shumagin district. Eight stream guards, most of whom were in the Seward-Katalla district, provided their own launches.

In western Alaska 24 were on Bristol Bay and 3 in the Yukon-Kuskokwim district.

There were also 7 special employees engaged in scientific work—2 on herring and 5 on salmon investigations, this work being carried on in southeastern and central Alaska.

In addition, there were 12 statutory employees, 51 men on the Bureau's vessels, and 3 on the 3 chartered boats.

The foregoing makes a grand total of 237 persons identified with fishery-protective work in Alaska in 1934, as compared with 203 in 1933.

VESSEL PATROL

Twelve vessels of the Bureau were operated in the Alaska fisheries patrol in 1934, and two, the *Widgeon* and *Petrel*, were out of commission at Seattle. The vessels on duty were assigned as follows: the *Auklet*, *Kittiwake*, and *Teal* in southeast Alaska throughout the season; the *Eider* in the Kodiak area; the *Ibis* at Chignik; the *Murre* in the Seward-Katalla district; the *Red Wing* in the Alaska Peninsula area; and the *Coot* on the Yukon River. The *Scoter* was on Cook Inlet until August 25 and afterwards in the Kodiak area. The *Crane* was engaged in the patrol of the Alaska Peninsula area and carried employees to and from Bristol Bay at the beginning and end of the season. The *Blue Wing* operated in Bristol Bay waters during the fishing season there and later in the Alaska Peninsula area; in the fall it was used in the vicinity of Wrangell. The *Brant* made a cruise as far west as Unalaska in connection with general supervisory work, and from August to October it was engaged in the patrol of southeast Alaska.

The *Eider* and *Brant* also participated successively in the seal patrol in the vicinity of Neah Bay during the spring migration of the fur-seal herd. The *Auklet*, *Crane*, and *Scoter* were used in the C. W. A. project of clearing salmon spawning streams in southeast Alaska in the winter of 1933–34.

Seven small boats, including a speed boat, were operated by the Bureau in the patrol of the Bristol Bay area, and 3 other speed boats were used elsewhere—1 on Copper River and Prince William Sound, 1 in the vicinity of Wrangell, and 1 in the general patrol of southeast Alaska.

In addition to the vessels belonging to the Bureau, several boats were chartered for patrolling fishing areas, as follows: the *Sterling* in the Ketchikan district, the *Lady Luck* in the Wrangell district, and the *Wingham* in the Seward-Katalla district, chiefly on Copper and Bering Rivers. The launch *Marie S* was used on the Kuskokwim River.

Special attention was given to reconditioning and repairing vessels of the Alaska fleet at Seattle in the winter of 1933–34 under an allotment of $20,000 for this purpose by the Public Works Administration. Nearly all the vessels were overhauled; those receiving the most extensive repairs were the *Brant*, *Teal*, *Eider*, *Kittiwake*, and *Murre*, of the fisheries patrol service, and the Pribilof Islands tender *Penguin*.

The *Merganser*, which for a number of years was used in the patrol of the Ikatan-Shumagin district and more recently was employed by the Division of Fish Culture as local tender for the Yes Bay hatchery, was formally transferred back to the Alaska Division in September 1934. It was reconditioned at Seattle during the winter preparatory to being assigned to patrol duty in the Wrangell district next season.

AERIAL PATROL

The use of aircraft to supplement the regular patrol of the fishing grounds by vessels was on a considerably larger scale in 1934 than in the previous year. Planes were chartered from a commercial company and used for general patrol during weekly closed periods in various parts of Alaska, particularly in the southeastern area and on Copper River Delta and Prince William Sound. Such a patrol has proved very effective, both in detecting and in deterring violations of the law and regulations. Several flights were made also in connection with general supervisory work and observations of the spawning grounds in some sections.

COMPLAINTS AND PROSECUTIONS

A floating trap operated by the Deep Sea Salmon Co. in southeast Alaska was seized on August 9 for illegal fishing. This trap was located on the shore of Harry Bay at a point approximately 3 nautical miles northeast of Cape Fox, where the use of traps was prohibited. The case was tried before the United States Commissioner at Ketchikan, and a fine of $1,000 was imposed, together with costs of $70, upon payment of which the trap was released.

Five purse-seine boats, manned by 19 Indians and 1 white, were seized for fishing in closed waters tributary to Portland Canal, the violations having been detected by airplane patrol. The cases were tried in the Commissioner's court and convictions were secured in each instance. Fines amounting to $150, $200, and $250, respectively, were imposed on the crews of the *Prince T–1184*, *Bear T–623*, and *Norma*, which fished near the mouth of a salmon stream in Fillmore Inlet on August 7; while in the case of the *Ulloa* and *Herbert B*, which fished near a salmon stream in Tombstone Bay on August 9, the fines were $375 and $300, respectively. When the infringement of the *Herbert B* was observed, the seine had been set to encircle the mouth of the creek, and a member of the crew was upstream, apparently driving the salmon down to the net.

On the west coast of Prince of Wales Island, also, 5 purse-seine boats, each with a crew of 5 men, most of whom were Indians, were seized for fishing in closed waters during August and September. Of these, the *Thelma Jane* and the *Adelia* were found fishing near the mouth of Staney Creek, the *Lois D* near the mouth of Calder Creek, the *Da-Kee-Noo* in Little Soda Bay, a small indentation of Trocadero Bay, and the *Lilly* near the mouth of a stream at the head of Keete Inlet. Brought to trial before the United States Commissioner at Craig, the defendants pleaded guilty and were assessed fines amounting to $375 for the crew of each boat, upon payment of which the boats were released to the owners. Each of the boats had a catch of salmon on board at the time of seizure. These fish were sold to local buyers and the proceeds, amounting to a total of $587.18, were turned over to the Department of Justice.

In the Seward-Katalla district 5 fishermen were arrested for fishing in waters closed to commercial operations. One of these men, charged with fishing within 500 yards of the grass banks on the Copper River delta between Copper River and Pete Dahl sloughs, was taken before the United States Commissioner at Cordova, where he pleaded not guilty and was bound over to the grand jury. The case was later dismissed. Another was fined $100 for fishing near the mouth of Bear Creek; the sentence was suspended, and the seized gill net was forfeited to the United States. Three of the fishermen were charged with fishing in Cochrane Bay; the case against one was dismissed, as it was found that he had not been connected with the activity; one was fined $40, and upon failure to pay he was sentenced to serve 20 days in jail; and one was fined $50, although this was afterwards suspended.

A complaint was filed by local fishermen in Prince William Sound against the Copper River Packing Co. for illegal operation of three salmon traps after the close of the fishing season. The allegation was that the tunnels from pots to spillers had not been disconnected within 36 hours after the beginning of the closed period. At the end of the year the case was still pending.

Two gill-net fishermen were arrested for fishing from a small gas boat in closed waters at the mouth of Kenai River on July 17. They were tried before the local commissioner at Kenai and fined $15 each. Twenty-five red salmon which were in the net at the time of the seizure were sold to a local buyer and the proceeds were turned over to the Department of Justice.

Four fishermen operating beach seines in the Kodiak area for the Washington Fish & Oyster Co. at Port Williams were charged with violation of the act prohibiting aliens from fishing in the waters of Alaska. Upon trial in the Commissioner's court at Kodiak they pleaded guilty and were fined $100 each; they elected to serve out their time in jail. Four shackles of gill net, found illegally fishing during a weekly closed period, were seized on July 1 on the mainland shore in the Kodiak area. The owners were not apprehended, and the nets were turned over to the United States deputy marshal at Kodiak for disposition.

Charges were brought against the Alaska Packers Association at Chignik and the superintendent of the cannery there for wanton waste of salmon, as large numbers of short cuts of red salmon were found dumped on the beach outside the cannery on June 23. Proceedings were started by the United States district attorney at Valdez, but the company requested that action be brought in court at Seattle, Wash., and the request was granted. The charges were accordingly brought in the United States district court at Seattle in December, and on January 19, 1935, the company's attorney appeared before the judge and pleaded guilty for the defendants. Each defendant was fined $100 and costs, and the fines were paid.

By order of the district attorney at Valdez, the gill net and other fishing gear that had been seized from Harry W. Crosby in July 1933 were taken to Kodiak on the *Penguin* in November 1934 and turned over to the marshal for condemnation.

Four Bristol Bay fishermen operating two gill-net boats of the Red Salmon Canning Co. were arrested for fishing about 7 miles above the markers in Ugashik River on July 14. Upon trial before the local commissioner, they pleaded guilty and were fined, 2 of them at $50 each, and 2 at $30 each. The salmon which they had taken were confiscated for the Government and were sold for $173.37.

DECISION REGARDING LICENSE FEE FOR NONRESIDENT FISHERMEN

On June 4, 1934, the United States Circuit Court of Appeals for the Ninth Circuit at San Francisco rendered a decision affirming that of the District Court of Alaska upholding the right of the Territorial Government of Alaska to impose certain license taxes on fishermen.

The act of the Territorial Legislature approved April 20, 1933, fixed license fees at $1 for each resident fisherman of all classes and $25 for each nonresident fisherman.

The suit was brought by a nonresident gill-net fisherman. In seeking to have the decision of the district court set aside, it was contended that the Alaska Legislature has no right to discriminate between citizens of the United States who are residents of Alaska and those who are not.

As bearing upon the matter, the decision of the court of appeals stated, in part, as follows:

> The question involved here, then, is not the power of the legislature to discriminate between residents and nonresidents, but the question is whether or not the license fee imposed by the Territorial Legislature is an unreasonable interference with a right granted by Congress, and, therefore, impliedly prohibited by Congress. It is clear, then, that so long as the license tax imposed by the Territorial Legislature upon the citizens of the United States who are not residents of Alaska is not so exorbitant as to practically prohibit, or so unreasonable as to interfere with, the exercise of the right granted by Congress, it is within the power of the Territorial Legislature. We cannot say that the license fee imposed by Territorial Legislature in 1933 and now under attack is so unreasonable as to conflict with the act of Congress granting the right to fish.

Pending this decision nonresident fishermen of Alaska had been paying their licenses under protest, but as the law has been held valid they will not be able to recover such payments.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in subsequent sessions of the Territorial Legislature. A statement from Oscar G. Olson, Territorial treasurer, under date of May 15, 1935, gives the collections made to that date for the year 1934. It was stated that collections under the several schedules were fairly complete, although a number of the fisheries companies had not yet made full settlement. The outstanding salmon pack taxes amounted to approximately $75,000 and about $10,000 was still due on fish traps, while $6,000 was still to be collected on fish oil and fertilizer.

Fishery license taxes collected by Territory for fiscal year ended Dec. 31, 1934

Schedule	Division no. 1	Division no. 2	Division no. 3	Total
Salmon canneries (pack)	$166,621.86	$14.40	$574,389.22	$741,028.48
Clam canneries	1.06		557.04	558.10
Salteries	1,439.69	181.82	1,542.95	3,164.46
Cold-storage plants	900.00			900.00
Fish-oil works and fertilizer and fish-meal plants	22,279.60		7,672.71	29,952.31
Whale oil and fertilizer stations			9,549.00	9,549.00
Fish traps	81,691.88		44,393.05	126,084.93
Gill nets	144.30	51.00	4,464.40	4,959.70
Seines	4,795.00		2,520.00	7,315.00
Total	278,176.39	247.22	645,088.37	923,511.98
Salmon canneries (net income), not possible of segregation as to judicial division				19,371.30
Total collections				942,883.28

WATER-POWER PROJECTS IN ALASKA

An application for a permit to utilize the waters of Tunnel Creek tributary to Paul Lake, Prince of Wales Island, was referred to the Bureau by the Federal Power Commission for report as to the requirements which should be stipulated in the permit to protect migratory fish. It was found upon investigation that Tunnel Creek is not a salmon spawning stream, and the Commission was informed that no special conditions need be required of the licensee.

KUSKOKWIM RIVER

As in previous years, Stream Guard Charles McGonagall patrolled the Kuskokwim River district for about 3 months, using a chartered launch. Several of the local inhabitants had planned to mild-cure and hard-salt limited amounts of salmon for export, but the shipment of barrels and salt from Seattle was delayed several weeks by the longshoremen's strike, and by the time these supplies reached the Kuskokwim area the run of king salmon was over. There was no commercial fishing for export from Alaska at the mouth of the Kuskokwim in the 1934 season.

Fishing conditions at the mouth of the river were ideal, as few storms occurred during the runs, especially during the king-salmon run, which reached its peak from June 15 to 20. The peak of the runs of chum and red salmon was from June 20 to July 1. Both natives and whites had their catches in the fish houses by the middle of July. Little fishing was done after that date, as there was practically no market for dried fish, the use of airplanes instead of dog teams having been extended to additional routes. Three hundred and eighteen natives fished in the river for local requirements, using 705 gill nets of 10,580 fathoms, 47 wheels, and a number of small boats. They prepared 388 tons of dried chums.

YUKON RIVER

Four outfits engaged in commercial fishing at the mouth of the Yukon River in 1934 and prepared products for the outside market amounting to 447 tierces of mild-cured and 134 barrels of pickled king salmon. The output was considerably curtailed by reason of a shortage of tierces and salt, due to the water-front strike in Seattle which necessitated the discontinuance of operations before the end of June. By the time additional supplies were received, the run of king salmon had passed.

In the fall of 1933 some of the operators in this district had holes dug in the tundra and covered with poles and moss. High tides filled these holes with water, which froze solid during the winter, thus furnishing excellent cold-storage facilities in the curing season.

Operations were begun at the opening of the season on June 5, but catches were light until June 14; a good run of king salmon occurred thereafter, which reached its peak between June 29 and July 7. Chum salmon began to arrive at the same time as the kings, but very little fishing for this species was carried on until after the salteries had closed. A second run of chums entered the river on July 29; this run was exceptionally heavy at the mouth and as far upstream as Pilot Station. The catch from Pilot Station to Tanana, except at a few camps, was the lightest in years, which was attributed largely to the fact that the river was high and full of driftwood, interfering with operation of the wheels.

A patrol of the district was maintained by Inspector C. F. Townsend and a stream guard aboard the *Coot*. The vessel departed from the Government ways at Nenana on May 23 for the mouth of the river and returned to Nenana on September 11.

Products of the Yukon and Tanana fisheries, including the commercial output, were as follows: 144 cases of kings canned, 624 pounds of canned smoked kings, 447 tierces of mild-cured kings, 28,200 pounds of kings and 650 pounds of chums pickled, 200 pounds of kippered kings, and 308 tons of dried chums. Apparatus consisted of 215 wheels, 180 gill nets of 3,561 fathoms, 1 motor vessel of 40 tons, 3 launches, 4 scows, and miscellaneous small boats. There were 34 whites and 393 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

Twelve weirs for counting the escapement of spawning salmon were operated in Alaska in 1934 to provide information needed in connection with the biological studies of the salmon and the regulation of commercial fishing. This represents an expansion of the weir work over that of the previous year, which was made possible through an allotment of $6,000 from the Public Works Administration to be used in the fiscal years 1934 and 1935 for reconditioning and reestablishing Alaska weirs. Those reestablished under this appropriation were the Klawak Creek weir in southeast Alaska and the Red River, English Bay, Morzhovoi Bay, and Orzenoi Bay weirs in central Alaska.

Weirs were again maintained at Karluk River, Chinik Creek, Chignik River, and Alitak Bay, where the escapement records have been kept for a series of years. In addition, counting operations were resumed on Situk River and in the salmon stream tributary to

Kaflia Bay, after having been suspended in the 1933 season. Upon the recommendation of Dr. Frederick A. Davidson, who has conducted scientific studies of the pink salmon in southeast Alaska since 1929, operation of the Olive Cove weir was discontinued, and instead thereof a new weir was erected in 1934 at Little Port Walter.

Reports of operations of the weirs and of the counts of salmon in 1934 are as follows:

KLAWAK CREEK

The weir in Klawak Creek was erected in the same location as in the years 1930 to 1932, inclusive. Red salmon began to appear on June 4, but it was not until July 30 that pink salmon passed upstream. The escapement was small until August 18, after which it held up well for several weeks, reaching its peak on September 8, when 51,352 pink salmon were tallied. The total count for the season through October 8 consisted of 406,163 pink salmon, 16,402 chums, 16,374 reds, and 7,341 cohos. L. M. Johnson was the weir operator, under the direction of Warden Alexander P. Romine.

LITTLE PORT WALTER

From August 18 to September 17, inclusive, 6,952 pink salmon, 15 chums, and 1 coho were counted through the new weir in the stream at the head of Little Port Walter. This weir was established primarily to furnish information in connection with the biological studies of pink salmon in southeast Alaska. S. J. Hutchinson was in charge of operations, under the direction of Dr. F. A. Davidson.

SITUK RIVER

The weir in Situk River was completed on June 4, but salmon did not begin to pass through until 2 weeks later. More than 6,000 ascended to the spawning grounds on June 19, and the peak of the run occurred on July 10, with an escapement of 14,548 red salmon. In order to assure the escapement of at least 50 percent of the run of red salmon in this locality, the 60-hour weekly closed period specified by the regulations was extended 48 hours from 6 o'clock antemeridian July 1 and 72 hours beyond 6 o'clock antemeridian of the following Monday, in the Situk and Ahrnklin River locality. When counting was discontinued on August 5 the total escapement numbered 121,529 red salmon, 13,817 pinks, 1,486 kings, and 3 cohos. Assistant Agent Walter W. Kinsey directed the weir operations at this place.

ALITAK BAY

Construction of the cannery station weir on Olga Bay, in the Alitak Bay region, was begun on May 11 and completed on May 14. A trap for the capture of predatory trout was also installed during this period and was operated until the weir was removed. During the season 21,612 trout were taken by the trap and by hook and line. The seaward migration of young red salmon was the largest observed at the cannery stream since 1927.

The first red salmon were tallied on May 23, and counting was continued through August 20, when the total escapement consisted of 70,219 reds and 15,495 pinks. The largest count for any one day was on August 18, when 7,366 red salmon and 4,722 pinks went through the weir. It was estimated that 75,000 red salmon were in the lagoon and bay at the time the weir was removed; they passed upstream to the spawning beds within the next few days. Many pink salmon also ascended the stream after counting was discontinued.

No count was made of the salmon in the upper station stream, which normally harbors the largest run in the Olga Bay region, but there was a good escapement, estimated to be fully 400,000 red salmon.

The work at this weir was in charge of Henry B. Looff, under the supervision of Warden Charles P. Turner.

CHIGNIK RIVER

The Chignik weir was located about 150 feet below the site used in the previous year, where the river is approximately 450 feet wide and from 2 to 4½ feet deep. It was of the usual tripod type, with four 22-inch counting gates and a 76-inch gate to permit the passage of small boats. Construction work was started on April 30 and completed on May 21. The river was low at that time and for most of the season, and there were no freshets to damage the structure and interrupt counting operations.

Red salmon began to pass upstream on June 5, but no appreciable numbers appeared until June 10, when a good run started, which continued steadily to July 16 and then gradually diminished to the end of the season. The peak of the run occurred in the last week of June, when the total escapement for the week numbered 370,620 red salmon. The fish of this species were of exceptionally large size, while pinks were smaller than usual. No count was made of the pink salmon, as these fish spawn chiefly in streams emptying into Chignik Bay and Lagoon below the weir.

From June 5 to September 16, inclusive, 1,282,514 reds, 42,174 cohos, and 1,390 kings were counted through the weir. The total commercial catch of red salmon from the Chignik run was 1,032,059. Warden Charles Petry was in charge of the Bureau's work at this place.

CHINIK CREEK

A weir was again operated in Chinik Creek, tributary to Kamishak Bay, and from July 2 to July 30, inclusive, 35,778 red salmon and 162 pinks were counted. As the reported commercial catch exceeded the escapement at the weir on July 6, the locality was closed to commercial fishing until July 24 in order to permit an escapement of 50 percent of the run of red salmon. The work at this weir was in charge of Warden William B. Berry.

ENGLISH BAY

From June 25 to August 3 there were counted 1,655 red salmon and 170 pinks through the weir in the stream at the head of English Bay. A fair run of reds had ascended the stream earlier in June. A trap for the capture of Dolly Varden trout was operated near the weir, and 6,025 of these predatory enemies of the salmon were caught and destroyed. Warden William B. Berry supervised the work at this weir.

KAFLIA BAY

The Kaflia Bay weir, located between the second lagoon and the first lake at the head of the bay, was installed on June 9, and the first count of salmon was made on that day. The run was very light until June 29, when a heavy rain raised the river 16 inches. At that time all the fish that had been collecting in the lagoon went up the river. The peak of the run occurred in the first week of July, after which it tapered off gradually. When the weir was removed on August 9 the total count numbered 13,295 red salmon and 375 pinks. This weir was in charge of Joe Zimmerman, who also acted as watchman in the bay, under the direction of Warden Charles P. Turner.

KARLUK RIVER

Construction of the Karluk weir was begun on May 18 and, being facilitated by good weather and a low stage of the river, was completed on May 22. While this work was under way a number of red salmon were already ascending to the spawning grounds, and natives had made some good catches in the lower lagoon the previous week. The escapement was very light, however, until a heavy rain on June 3 caused the fish to move upstream. On the following day 113,421 red salmon were counted, which was by far the largest escapement for any one day during the season. The largest weekly escapement of red salmon was 220,828 for the week ending June 23. Throughout July and August the run was light.

The run of pink salmon began about the middle of July and reached its peak in the week ending August 11. Spent pinks began to come downstream in large numbers on August 18, when the river was rising as a result of heavy rains. On August 20 it was necessary to install additional gates in the weir to allow the dead pinks to pass through, and on August 22 half of the structure was removed, as the crew was unable to handle the increasing number of spent fish. The river at this time was 20 inches above its normal summer level. It was not until September 17 that the weir was reestablished, and only a small escapement occurred thereafter until the weir was removed on October 5.

During the period in which the weir was in operation—from May 23 to August 21 and from September 18 to October 5, inclusive—846,299 red salmon, 978,171 pinks, 9,579 kings, and 6,141 cohos were counted through the gates. It was estimated that 300,000 red salmon ascended to the spawning grounds in the interval from August 22 to September 17, inclusive, which would bring the total escapement of that species to 1,146,299. The reported commercial catch of red salmon from Cape Karluk to West Point was 928,502, indicating that 45 percent of the Karluk run was caught and 55 percent escaped to the spawning grounds.

Young red salmon migrating seaward were seen in the river from May 21 to June 15. Fifty thousand red-salmon fingerlings were marked at Karluk during the season.

Morris Rafn was in charge of the Karluk weir, under the direction of Warden Charles P. Turner.

MORZHOVOI BAY

Red salmon ascending the stream that empties into Middle Lagoon, Morzhovoi Bay, were counted through a weir from June 24 to September 8, inclusive, during which time a total escapement of 81,748 was recorded. This is more than twice as many as the largest count previously made at this place in the years 1926 to 1932, inclusive. At the beginning of the season counting operations were carried on by David E. Hughes, and later by Mike Clipper, under the supervision of Warden Fred R. Lucas.

ORZENOI RIVER

The weir in Orzenoi River was ready for operation on June 23 and the first salmon passed upstream to the spawning grounds on July 4. Counting was continued through July 22, on which date the structure was washed out by a freshet, with the loss of so much material that it could not be replaced for the remainder of the season. The total count numbered 6,634 red salmon and 172 pinks. Thomas B. West was the weir operator, under the direction of Warden Fred R. Lucas.

RED RIVER

From May 23 to August 15, inclusive, 1,159,466 red salmon, 1,369,392 pinks, and 1,994 kings were counted through the weir in Red River, and many fish were still ascending the stream at the time the rack was removed. More than 100,000 predatory trout were exterminated during the season. Henry B. Looff directed operations at this weir, under the supervision of Warden Charles P. Turner.

SALMON LIFE-HISTORY STUDIES

Studies of the biology of the Alaska salmon were continued in 1934 by the staff of investigators of the Fisheries Biological Station, at Seattle, Wash. Although these studies are carried on each year in more or less definite localities in Alaska, they have as their common goal the determination of the natural and artificial factors responsible for the fluctuations in the abundance of the salmon throughout the entire Territory. Two major investigations dealing with the red salmon, at Karluk and Chignik, and one pertaining to the pink salmon, at Little Port Walter, were in progress during the year. Data pertaining to the runs in all sections of the Territory were likewise collected for the purpose of keeping account of the general biological trend in the salmon fisheries as a whole.

The results from these investigations and the data collected at various points throughout the Territory indicate that the mortality of the young during their life in fresh water and their rate of growth in the ocean are factors which greatly influence the abundance of the salmon that return to spawn each season. Efforts are being made to evaluate these natural factors in order to provide information relative to the probable abundance of each year's salmon runs.

Studies dealing with the seasonal change in the quality of the salmon that enter the commercial fisheries of Alaska were also continued during the year. These studies are being carried on in cooperation with the National Canners Association of Seattle, and a report dealing with the seasonal change in the quality of the pink salmon in southeastern Alaska is being prepared for publication in 1935.

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

Throughout the fishing season the runs of salmon were observed closely to assure the maintenance of an adequate breeding reserve in the streams of all districts, and the spawning grounds of representative streams were inspected after the close of commercial operations.

Southeast Alaska.—The pink salmon runs were late in entering the inside waters of southeastern Alaska, except in the southern district, where they were early. The runs generally were large, but because of low water in the streams the heavy early run in the vicinity of Ketchikan was prevented from reaching the spawning grounds. This run continued until after the close of the season, however, and good escapements were obtained when the fall rains began. The Behm Canal region was particularly well seeded. Streams along the east coast of Prince of Wales Island were well stocked with spawning pinks from the late run in that section. The tributaries of Ernest Sound and Bradfield Canal were satisfactorily seeded in spite of heavy drains on the pink salmon runs in those waters by commercial operations. The escapement of pink salmon was good in all important streams on the west coast of Prince of Wales Island, and in the Icy Strait, western, and eastern districts the escapements of this species were reported to be above average. In the Yakutat district the pink run was light, and low water in the streams contributed to unsatisfactory spawning for this species.

The red salmon runs were below normal in all districts except Yakutat and in the vicinity of Wrangell. The run of reds in the Yakutat district was reported to have been better than in 1933, and good escapements were observed in all streams. Good escapements of kings also were obtained in the Yakutat district.

The early runs of chums were small in all districts, and the escapements were below normal in the Wrangell-Petersburg region and on the west coast of Prince of Wales Island. Fair escapements of chums in other districts were derived from late runs, the bulk of which reached the spawning grounds because of the relatively small amount of fall fishing.

The coho runs in all parts of southeastern Alaska were heavier than usual, and the escapements were considerably above average.

Prince William Sound and Copper River region.—The escapement of all species in Prince William Sound streams was very satisfactory. Of particular interest was the much improved pink salmon escapement in streams tributary to Port Wells, where the runs are so seriously depleted as to require prohibition of all commercial fishing. There was a good run of red salmon to Copper River and a good escapement was obtained. The escapement of kings in Copper River also was good. The run of reds to Bering River was much better than in 1933, and it is believed that a 50-percent escapement was obtained. There was no fall fishing off the mouths of Bering River or Copper River and the entire coho runs escaped to the spawning grounds.

Cook Inlet.—There was a heavy run of red salmon to the Kenai and Kasilof Rivers, and exceptionally good escapements were obtained. The individual fish of this species were said to be of large size. These rivers also had an ample seeding of pinks and kings. Very good escapements of reds were observed in McNeil and Chinik Creeks in Kamishak Bay. Fair seeding of all species was reported in Turnagain Arm and Knik Arm in the northern part of the inlet.

Kodiak area.—Good runs of red salmon appeared in Shelikof Strait, and the spawning grounds of all important streams were well seeded. An exceptionally large escapement of this species was observed in Uganik Bay. Spawning escapements of red salmon in other streams throughout the district were satisfactory except in Kaflia Bay, where a light run and small escapement were experienced.

The pink salmon runs to Karluk and Red Rivers were heavy, and on the south side of Kodiak Island the runs of this species were better than had been anticipated. As a result, good escapements were obtained. Light runs and escapements of pinks appeared in Danger Bay, Buskin River, Kalsin Bay, and Uyak Bay and its tributaries. The escapement of chums was generally fair.

Chignik.—The red salmon run at Chignik was heavy during June and July and resulted in a very satisfactory escapement. These fish were reported to be unusually large in size. The spawning grounds were fairly well seeded with pinks and chums, but the coho escapement was small.

Alaska Peninsula.—The runs of all species in this region were normal, but because of the increased intensity of commercial operations the spawning grounds of many streams were inadequately seeded. A late run of pink salmon entering the bays after the close of fishing was largely responsible for the escapement of that species in streams along the south side of the peninsula.

Bristol Bay.—The Kvichak, Naknek, and Egegik Rivers had exceptionally heavy runs of red salmon. The runs began in these rivers in advance of the fishing season and continued at a relatively high level until after the close of operations. Fish were so plentiful that many of the canneries completed their packs before the end of the season. Not only were the reds unusually abundant but they were also larger than average in size. The escapements to these rivers were very large. The run to Nushagak River was smaller in volume and later in appearing than that in the Egegik and Kvichak-Naknek waters. Although not large, the escapement was considered adequate. A run of satisfactory proportions appeared in the Ugashik River, and the escapement was considerably better than for many years.

HATCHERIES

Only one hatchery was engaged in the propagation of salmon in Alaska in 1934. This was the privately owned hatchery on Hugh Smith Lake, which was operated by the Pacific American Fisheries.

From the 20,650,000 red-salmon eggs that were collected at the Hugh Smith Lake hatchery in 1933 there were produced and liberated in Alaska waters 20,030,000 salmon fry. A collection of 10,221,000 red-salmon eggs was made at this hatchery in 1934.

Under provisions of the act of June 26, 1906, the owners of private hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them in Alaska waters. In the fiscal year ended June 30, 1934, therefore, the rebate due the Pacific American Fisheries on the 20,030,000 red-salmon fry liberated at Hugh Smith Lake during the year amounted to $8,012.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1934 was 26,190, or 4,495 more than in 1933. Fishery products were valued at $41,963,293, an increase of $9,836,705, or about 31 percent over the preceding year. Of the total amount, 92.4 percent represented the value of salmon products; 3.8 percent, herring; 1.9 percent, halibut; and 1.9 percent, the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1934

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	6,026		4,154		3,936		14,116	
Natives	3,394		1,305		1,355		6,054	
Chinese	162		238		477		877	
Japanese	591		352		370		1,313	
Filipinos	1,317		1,095		599		3,011	
Mexicans	17		1		713		731	
Negroes	2		1		22		25	
Miscellaneous	17		3		43		63	
Total	11,526		7,149		7,515		26,190	
PRODUCTS								
Salmon:								
Canned ... cases	3,295,093	$13,981,043	2,327,418	$11,452,568	1,859,319	$12,178,339	7,481,830	$37,611,950
Mild cured ... pounds	3,162,400	559,329	12,800	1,298	357,600	55,484	3,532,800	616,111
Pickled ... do			254,400	17,432	133,050	11,555	387,450	28,987
Fresh, for food ... do	1,385,789	69,837					1,385,789	69,837
Frozen, for food ... do	5,316,574	334,812					5,316,574	334,812
Fresh, for bait and fox feed ... do	24,600	150	2,000	10			26,600	160
Frozen, for bait ... do	99,700	450					99,700	450
Dry-salted, dried, and kippered ... do			35,450	1,794	1,404,200	56,300	1,439,650	58,094
Smoked and canned ... cases					18	140	18	140
Fertilizer ... pounds	702,000	10,530	313,560	4,703			1,015,560	15,233
Oil ... gallons	15,450	9,590	18,270	4,111			33,720	13,701
Herring:								
Fresh, for bait ... pounds	2,117,160	21,201	1,241,625	10,663			3,358,785	31,864
Frozen, for bait ... do	3,009,765	20,229					3,009,765	20,229
Pickled, for bait ... do			23,400	166			23,400	166
Pickled, for food:								
Scotch cure ... do	2,137,075	119,791	3,251,875	225,323	2,020,250	100,362	7,409,200	445,476
Norwegian cure ... do	21,790	965			208,750	7,333	230,540	8,298
Roused, for food (bloater stock) ... do					513,050	16,854	513,050	16,854
Spiced ... do	2,600	390	40,400	770			43,000	1,160
Dry-salted ... do					80,400	2,701	80,400	2,701
Meal ... do	19,956,468	316,604	7,954,000	125,613			27,910,468	442,217
Oil ... gallons	2,615,898	446,557	1,094,450	187,502			3,710,348	634,059
Halibut:								
Fresh ... pounds	7,253,775	444,525					7,253,775	444,525
Frozen ... do	5,967,563	360,260					5,967,563	360,260

Cod:									
Dry-salted	do			170,800	6,119	181,545	7,039	352,345	13,158
Pickled	do			115,160	4,245	2,000	100	117,160	4,345
Stockfish	do			23,400	2,403			23,400	2,403
Whale:									
Oil	gallons			379,250	88,745	431,700	107,925	810,950	196,670
Sperm oil	do			9,600	2,112	66,900	14,718	76,500	16,830
Fertilizer	pounds			1,330,000	18,389	1,368,000	19,116	2,698,000	37,505
Clam: Canned	cases	71	144	31,725	188,522			31,796	188,666
Crab:									
Canned	do	8,736	71,566	13,067	112,486			21,803	184,052
Meat	pounds	68,082	21,254	3,880	1,164			71,962	22,418
Whole in shell	dozen	545	696	392	497			937	1,193
Shrimp:									
Canned	cases	93	279					93	279
Meat	pounds	375,015	118,619	2,208	688			377,223	119,307
Whole in shell	do	3,780	525					3,780	525
Trout:									
Canned	cases	475	1,103					475	1,103
Fresh	pounds	23,372	1,441					23,372	1,441
Frozen	do	31,341	2,443					31,341	2,443
Dried	do			1,500	30			1,500	30
Sablefish:									
Fresh	do	9,075	349					9,075	349
Frozen	do	206,069	9,138					206,069	9,138
Pickled	do	200	12					200	12
Rockfish:									
Fresh	do	1,100	30					1,100	30
Frozen	do	3,194	112					3,194	112
Flounder: Fresh	do	270,000	4,000					270,000	4,000
Total			16,927,974		12,457,353		12,577,966		[1] 41,963,293

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[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $11,707,000. The round weight of the salmon catch landed by the fishermen was approximately 624,651,000 pounds, and the corresponding figure for herring was about 165,637,000 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 4,930,701 pounds of dry-salted cod and 11,675 pounds of tongues, having a total value of $213,366, landed at ports of the Pacific Coast States.

SALMON

Considering the salmon runs in Alaska as a whole, there was apparently a greater abundance and more even distribution in all districts than for any preceding year. The output of canned salmon was the largest in the history of the industry, exceeding the previous record pack for 1926 by 828,948 cases. Because of the large production during the summer, few canneries were operated in the fall season.

Heavy runs of red salmon again entered Bristol Bay, and although the catch in these waters was somewhat less than in the previous year, the decrease in numbers was more than offset by the larger size of the fish in 1934. Many of the Bristol Bay packers again had all their cans filled and discontinued operations before the close of the fishing season. Red salmon were plentiful also in the Chignik, Kodiak, Cook Inlet, and Copper River areas. The total catch of this species in Alaska was the largest since 1922, while the amount canned exceeded that for any previous year, which may be attributed in part to a decline in the pickled salmon industry, making almost the entire catch available for canning.

Enormous runs of pink salmon appeared both in southeastern and central Alaska, and the catch and pack of this species were the largest on record. Reports indicated that the fish were unusually small in the early runs in some sections but those that appeared later were of larger size.

Cohos, chums, and kings were fairly abundant, but no unusual catches were made of these species during the season. The total number of king salmon taken was the smallest for any year since 1914, which may be attributed in part to the suspension of operations in certain districts because of a shortage of containers and other supplies due to the longshoremen's strike on the Pacific coast and in part to strikes of fishermen for higher prices. The fishing season for king salmon in the Copper River area opened on May 1, but it was not until May 30 that an agreement regarding prices was reached between cannerymen and fishermen, largely through the mediation of Hugh J. Wade, representative of the National Industrial Recovery Administration in Alaska. When fishing was begun on May 31, the greater part of the king salmon run in that region was over. In southeastern Alaska a strike of the trollers continued through June and July and was finally settled through the organization of a cooperative marketing association. The voluntary curtailment of fall fishing likewise lessened the catch, particularly of cohos and chums.

The total catch of salmon increased 42 percent over that for 1933. By districts, southeastern Alaska and central Alaska showed gains of about 75 percent and 49 percent, respectively, while in western Alaska the catch decreased about 6 percent.

There was an increase of about 30 percent for the whole of Alaska in the number of fathoms of seines used, 5 percent in the number of fathoms of gill nets, and about 15 percent in the number of traps, as compared with those in operation in 1933.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1934 was 633, of which 493 were purse seines and 140 beach seines. The purse seines aggregated 76,445 fathoms of webbing, and the beach seines 13,678 fathoms. The number of gill nets used was 3,664, having a total length of 234,456 fathoms. There were 162 driven and 297 floating traps—a total of 459.

Southeastern Alaska was accredited with 346 seines, or a total of 57,690 fathoms, an increase of 22 seines and 5,415 fathoms of webbing over the number used in 1933; also with 304 gill nets, aggregating 21,015 fathoms, an increase of 39 nets, but a decrease of 3,610 fathoms of webbing; and with 28 driven and 262 floating traps, an increase of 9 driven and 20 floating traps, as compared with the number operated in 1933.

Corresponding figures for central Alaska show 281 seines, or 30,753 fathoms, as compared with 158 seines, or 15,632 fathoms, in 1933; 984 gill nets, or 52,815 fathoms, as compared with 956 gill nets, or 44,410 fathoms, in 1933; and 134 driven and 35 floating traps, as compared with 119 driven and 19 floating traps in 1933.

In western Alaska, 6 seines, or 1,680 fathoms of webbing, were used, a decrease of 3 seines, but an increase of 140 fathoms of webbing, as compared with the figures for 1933. There were 2,376 gill nets used, or an aggregate of 160,626 fathoms, an increase of 315 nets and 6,001 fathoms of webbing. No traps were operated in this district.

Seines caught 25 percent of the salmon taken in 1934, gill nets 22 percent, and traps 52 percent, while lines and wheels took the remaining 1 percent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1933	1934	1933	1934	1933	1934
Seines	31	29	28	33	1	5
Gill nets	2	1	8	7	97	94
Traps	65	68	64	60		
Lines	2	2				
Wheels					2	1

The total catch of salmon in 1934 was 116,649,072, an increase of 34,772,652, or 42 percent, over the number taken in 1933. The southeastern and central districts showed gains of 24,679,002 and 11,526,995, respectively, while there was a decrease of 1,433,345 in western Alaska. By species, the catch of cohos increased 750,565; chums, 234,056; pinks, 33,265,900; and reds, 571,217; while the catch of kings decreased 49,086.

Salmon taken in 1934, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	233, 352	39, 507		272, 859
Chum, or keta	2, 271, 837	1, 289, 960	10, 860	3, 572, 657
Pink, or humpback	14, 039, 724	8, 904, 675		22, 944, 399
King, or spring	1, 357	1, 489	1, 619	4, 465
Red, or sockeye	256, 492	1, 172, 144	1, 072, 341	2, 500, 977
Total	16, 802, 762	11, 407, 775	1, 084, 820	29, 295, 357
Gill nets:				
Coho, or silver	237, 638	134, 986	12, 656	385, 280
Chum, or keta	77, 244	59, 649	894, 049	1, 030, 942
Pink, or humpback	91, 024	409, 231	41, 430	541, 685
King, or spring	32, 294	72, 980	93, 541	198, 815
Red, or sockeye	293, 072	1, 799, 569	21, 620, 570	23, 713, 211
Total	731, 272	2, 476, 415	22, 662, 246	25, 869, 933
Traps:				
Coho, or silver	925, 261	573, 560		1, 498, 821
Chum, or keta	1, 456, 429	1, 778, 248		3, 234, 677
Pink, or humpback	36, 197, 142	13, 355, 087		49, 552, 229
King, or spring	7, 198	33, 091		40, 289
Red, or sockeye	692, 319	5, 301, 596		5, 993, 915
Total	39, 278, 349	21, 041, 582		60, 319, 931
Lines:				
Coho, or silver	559, 763			559, 763
King, or spring	298, 183			298, 183
Total	857, 946			857, 946
Wheels:				
Chum, or keta			288, 000	288, 000
King, or spring			17, 905	17, 905
Total			305, 905	305, 905
Total:				
Coho, or silver	1, 956, 014	748, 053	12, 656	2, 716, 723
Chum, or keta	3, 805, 510	3, 127, 857	1, 192, 909	8, 126, 276
Pink, or humpback	50, 327, 890	22, 668, 993	41, 430	73, 038, 313
King, or spring	339, 032	107, 560	113, 065	559, 657
Red, or sockeye	1, 241, 883	8, 273, 309	22, 692, 911	32, 208, 103
Grand total	57, 670, 329	34, 925, 772	24, 052, 971	116, 649, 072

CANNING

CHANGES IN CANNERIES

A new organization, the Scow Bay Packing Co., operated the plant at Scow Bay that had been leased by Hanseth Bros. in 1933. The cannery at Hoonah formerly belonging to the Hoonah Packing Co. was purchased and operated in 1934 by the recently incorporated Icy Straits Salmon Co. The Red Salmon Packers Association bought back the floating plant *Retriever,* which it had sold in 1930 to the New England Fish Co., and operated it in the Yakutat district. A new up-to-date 5-line cannery built by Libby, McNeill & Libby at Taku to replace the plant lost by fire in 1932 was in operation during the season. The New England Fish Co. and the Pacific American Fisheries reopened their canneries at Chatham and Excursion Inlet, respectively, which had been idle since 1931.

In central Alaska the operations of A. S. Day at Fort Liscum were carried on under the name of North Pacific Sea Foods. The Washington Fish & Oyster Co. leased and operated the cannery of Port Williams Packing Co. at Port Williams which had been closed since

1930. The Drier Bay plant of the Prince Packing Co. that had been operated under lease by the New England Fish Co. from 1928 to 1930, inclusive, was taken over and operated by the Alaska Pacific Salmon Co. Other plants that were reopened after having been idle for a year or more were the Kadiak Fisheries Co. at Shearwater Bay, the New England Fish Co. at Cordova, the Shelikof Packing Co. at Zachar Bay, the Shepard Point Packing Co. at Port Ashton, the Strand-Jensen Fisheries Co. at Cordova, and the Fidalgo Island Packing Co. at Port Graham. The Pacific American Fisheries operated its King Cove plant instead of the one at Ikatan.

The Kustatan Packing Co. removed from Kustatan to Anchorage, taking over the plant of the Toman Packing Co. at the latter place. The Farwest Fisheries, Inc., at Anchorage was succeeded by the General Fish Co., but the plant remained idle during the season, the pack being put up by Snug Harbor Packing Co. Only a limited pack of canned salmon was prepared by the Redoubt Bay Packing Co. at Redoubt Bay, and the plant is therefore not included in the list of canneries operated.

The Herendeen Bay Consolidated Canneries did not pack aboard the floating plant *Mazama*, but operated the Port Moller plant of the Pacific American Fisheries which had been closed in 1933.

Direct ownership has been acquired by the Pacific American Fisheries, Inc., of the plants formerly operated by subsidiary concerns, as follows: Petersburg Packing Co. at Petersburg, Alitak Fish Co. at Alitak and Zachar Bay, Shumagin Packing Co. at Squaw Harbor, and Alaska-Portland Packers Association at Naknek River and Nushagak Bay.

NEW CANNERIES

Eight new canneries were operated in 1934, of which 5 were shore plants, as follows: Lane Bros., a hand cannery at Moira Sound; Lindenberger Packing Co., at Craig; Cordova Fisheries Co., Inc., a hand cannery at Cordova; Herbert T. Domenici, at Uyak; and the Puget and Alaska Canning Co., which leased the plant at Seldovia that had formerly been used by the North Pacific Packing Co. for canning clams. New floating canneries were the *La Merced*, which was operated by the Alaska Southern Packing Co., Inc., in the Ikatan-Shumagin region and, in the fall season, at Tenakee in southeast Alaska; the *Memnon*, operated by the Columbia River Packers Association on the north and south sides of the Alaska Peninsula; and a large barge operated by the Western Pacific Packing Co. at Mist Harbor in the Shumagin Islands.

Lauritz Pedersen, of Unga, and Fred Phillips, of Valdez, put up small amounts of hand-packed salmon, but these have not been included in the list of canneries.

CANNERIES NOT OPERATED

Of the plants that had been operated in the previous year, only three were closed in 1934—the Cook Inlet Packing Co. at Seldovia, the Enterprise Seafood Co. at Ninilchik, and the Pacific American Fisheries, Inc., at Ikatan. It is not likely that the Ikatan plant will be operated again, as the machinery has been removed.

The Uzinki cannery of the International Packing Co. has been dismantled, and the cannery of Charles W. Pajoman at Iron Creek was used as a herring saltery by the Apex Fish Co. There have also been dropped from the list of idle canneries the Tutka Bay cannery of the San Juan Fishing & Packing Co., which was purchased by the Fidalgo Island Packing Co. and dismantled, and the Drier Bay plant of the Alaska Pacific Salmon Co., from which the company moved equipment to the cannery it acquired from the Prince Packing Co. The plant of the Trinity Packing Co. at Three Saints Bay was destroyed by fire in 1931 and has not been rebuilt.

The following canneries were closed during the year but may be reopened:

Southeast Alaska:

Alaska Pacific Fisheries	Burnett Inlet.
Alaska Pacific Salmon Co	Boca de Quadra. Chomly. Funter Bay. Pybus Bay. Tenakee.
Alaska Packers Association	Loring. Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Columbia River Packers Association	Lake Bay.
Hoonah Packing Co	Gambier Bay.
Icy Straits Fisheries, Inc. (floating plant)	Idaho Inlet.
Libby, McNeill & Libby	Klawak.
The Nakat Packing Corporation	Ketchikan.
Pacific American Fisheries, Inc	Boca de Quadra. Dundas Bay. Hunter Bay. Kasaan. Ketchikan. Port Walter. Santa Ana. Shakan.

Central Alaska:

Alaska Packers Association	Alitak. Chignik. Kasilof.
Anderson Mercantile Co., Inc	Deep Creek.
Blue Island Packing Co	Blue Fox Bay.
Cook Inlet Packing Co	Seldovia.
W. G. Culver	Point McManus.
Enterprise Seafood Co	Ninilchik.
General Fish Co	Anchorage.
Gustan & Vogel	Point Possession.
Hemrich Packing Co	Kukak Bay.
North Coast Packing Co	Ninilchik.
Northern Light Packing Co	Mountain Slough.
Pacific American Fisheries, Inc	Bering River. Chignik. Kenai. Orca. Unakwik Inlet. Uyak. Valdez. Zachar Bay.
Point Possession Fish Co	Point Possession.
Redoubt Bay Packing Co	Redoubt Bay.
E. Sandvik	Swansons Creek.
Harvey J. Smith	West Foreland.
Spur Fish Corporation	Nikishka Bay.
Sunset Packing Co	Otter Creek.
John Wik	Kenai.
Jake Young	Port Chatham.

Western Alaska:

Alaska Packers Association	Naknek River. Nushagak Bay.
Columbia River Packers Association	Do.
Herendeen Bay Consolidated Canneries	Herendeen Bay.
Pacific American Fisheries, Inc	Naknek River. Nushagak.
Red Salmon Canning Co	Naknek River.

TOTAL CANNERIES OPERATED

There were 110 canneries operated in Alaska in 1934—44 in southeast, 44 in central, and 22 in western Alaska—which is 7 more in the southeast and 12 more in the central district than in 1933, a net gain of 19 plants. The floating plant *Memnon* of the Columbia River Packers Association was operated both in western and central Alaska, and the Alaska Southern Packing Co.'s cannery *La Merced* put up a small pack in southeastern Alaska in the fall on its return from operations in the Ikatan-Shumagin region. However, these plants are included but once in the total, both being credited to the central district.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1934

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Salmon Co	4	Kake	1	10	11
		Ketchikan	5	6	11
		Port Althorp		19	19
		Rose Inlet		9	9
Alaska Southern Packing Co., Inc	1	Tenakee (floating)*			
Annette Island Canning Co	1	Metlakatla	1	7	8
Astoria & Puget Sound Canning Co	1	Excursion Inlet		7	7
Beegle Packing Co	1	Ketchikan	1	4	5
Berg Packing Co	1	Tongass Narrows (floating)			
Deep Sea Salmon Co	1	Skowl Arm		12	12
Diamond K Packing Co	1	Wrangell	2	3	5
Douglas Fisheries Co	1	Douglas			
Fidalgo Island Packing Co	2	Bay of Pillars	5		5
		Ketchikan	3	2	5
Haines Packing Co	1	Letnikof Cove			
P. E. Harris & Co	1	Hawk Inlet		8	8
Hood Bay Canning Co	1	Hood Bay		5	5
Icy Straits Salmon Co	1	Hoonah			
Independent Salmon Canneries, Inc	1	Ketchikan		1	1
Kelly Packing Co	1	do			
Ketchikan Packing Co	1	do		2	2
Klawock Packing Co	1	Klawak			
Lane Bros	1	Moira Sound *			
Libby, McNeill & Libby	4	Craig	1	9	10
		George Inlet		6	6
		Taku Harbor	4	7	11
		Yakutat			
Lindenberger Packing Co	1	Craig *			
Nakat Packing Corporation, The	3	Hidden Inlet		6	6
		Union Bay		6	6
		Waterfall		9	9
New England Fish Co	3	Chatham		5	5
		Ketchikan		6	6
		Noyes Island		6	6
Ocean Packing Co	1	Klawak			
Pacific American Fisheries, Inc	2	Excursion Inlet	1	7	8
		Petersburg	2	5	7
Peril Straits Packing Co	1	Todd		6	6
Pyramid Packing Co., Inc	1	Sitka		4	4
Red Salmon Packers Association	1	Yakutat (floating)			
Scow Bay Packing Co	1	Scow Bay		2	2
Sebastian Stuart Fish Co	1	Tyee		6	6
Superior Packing Co	1	Tenakee		5	5
Ward's Cove Packing Co	1	Ward Cove		4	4
Wrangell Packing Co	1	Wrangell		3	3

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1934—Continued

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Central Alaska:					
Alaska Pacific Salmon Co	2	Drier Bay		5	5
		Sand Point	5		5
Alaska Packers Association	2	Chignik	2		2
		Karluk	3		3
Alaska Southern Packing Co	1	Traders Cove and Kupreanof Harbor (floating)*			
Alaska Year-Round Canneries Co	1	Seldovia	3		3
Columbia River Packers Association	1	Chignik [1]	3		3
		Sankin Bay and Belkofski Bay (floating)*			
Copper River Packing Co	1	McClure Bay		6	6
Cordova Fisheries Co., Inc	1	Cordova *			
Harry W. Crosby	1	Chignik			
Herbert T. Domenici	1	Uyak			
Emard Packing Co	1	Anchorage	10		10
Fidalgo Island Packing Co	1	Port Graham	9		9
General Fish Co		Anchorage [1]	2		2
Glacier Sea Foods Co	1	Cordova (floating)	1		1
Grimes Packing Co	1	Uzinki			
P. E. Harris & Co	1	False Pass	8		8
International Packing Co	1	Sankin Bay and Ivanof Bay (floating).			
Kadiak Fisheries Co	2	Kodiak	5		5
		Shearwater Bay	1		1
Kustatan Packing Co	1	Anchorage			
Libby, McNeill & Libby	1	Kenai	15		15
New England Fish Co	1	Cordova	4	1	5
A. N. Nilson	1	Portlock			
Ninilchik Packing Co	1	Ninilchik	2		2
North Pacific Sea Foods	1	Fort Liscum			
Pacific American Fisheries, Inc	3	Alitak	6		6
		Chignik [1]	2		2
		King Cove	16		16
		Squaw Harbor	3		3
Pioneer Canneries, Inc	1	Cordova	2	1	3
Pioneer Sea Foods Co	1	Eyak River	3	3	6
Premier Salmon Co	1	Stevens Creek	2	1	3
Puget and Alaska Canning Co	1	Seldovia *			
San Juan Fishing & Packing Co	2	Port San Juan	2	2	4
		Uganik Bay	4		4
Albert and Josie Sandvik	1	Uganik Village			
Seward Fisheries, Inc	1	Seward			
Shelikof Packing Co., Inc	1	Zachar Bay			
Shepard Point Packing Co	2	Port Ashton		4	4
		Shepard Point		5	5
Snug Harbor Packing Co	1	Snug Harbor	5		5
Strand-Jensen Fisheries Co	1	Cordova			
Uganik Fisheries, Inc	1	Uganik	3		3
Washington Fish and Oyster Co., Inc	1	Port Williams			
Western Pacific Packing Co	1	Mist Harbor (floating)*			
Western Alaska:					
Alaska Packers Association	7	Egegik River			
		Kvichak Bay (2)			
		Naknek River (2)			
		Nushagak Bay			
		Ugashik River			
Alaska Salmon Co	1	Wood River			
Bristol Bay Packing Co	1	Kvichak Bay			
Columbia River Packers Association	1	Port Moller (floating)*			
Herendeen Bay Consolidated Canneries	1	Port Moller			
Libby, McNeill & Libby	6	Egegik River			
		Ekuk			
		Koggiung			
		Libbyville			
		Lockanok			
		Nushagak			
Lowe Trading Co	1	Nushagak River (floating)			
Nakat Packing Corporation, The	1	Nakeen			
Pacific American Fisheries, Inc	2	Naknek River			
		Nushagak Bay			
Red Salmon Canning Co	2	Naknek River			
		Ugashik River			

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[1] Traps only were operated, the fish being packed at other canneries.

LOSSES AND DISASTERS

In southeastern Alaska the reduction plant of the Salmoil Corporation at Mud Bay was destroyed by fire in July, with a loss of $25,400. Other losses reported for the district included the gas boat *White Bear* and miscellaneous fishing apparatus, the total value of which was $14,540.

Reported losses in central Alaska were various fishing boats, apparatus, and equipment, as well as damage to buildings and docks, amounting to $24,361; and in the western district, small boats, nets, and miscellaneous equipment, having a total value of $26,462.

Twenty-five lives were lost—3 in southeast Alaska, 12 in central, and 10 in western Alaska. Three shoresmen in the southeastern district died of disease. In central Alaska, 3 fishermen, 1 shoresman, and 3 transporters were drowned; 1 fisherman and 3 shoresmen died of disease; and 1 fisherman met death by accident. Five fishermen and 1 transporter in western Alaska were drowned; 1 fisherman died of disease; and 1 fisherman, 1 shoresman, and 1 transporter were killed in accidents.

STATISTICS

There were 110 canneries operated in Alaska in 1934, or 19 more than in the previous year. Employment was given to 21,654 persons, as compared with 17,130 in 1933, an increase of 4,524. White employees increased 2,585; natives, 735; Chinese, 279; Japanese, 330; Filipinos, 774; and miscellaneous (Kanakas, Koreans, and Puerto Ricans), 28; while Mexicans decreased 175, and Negroes 32.

The total pack of canned salmon was 7,481,830 cases, valued at $37,611,950. This was an increase of 2,256,226 cases, or 43 percent, over the pack of 1933, and an increase in value of $9,235,936, or about 33 percent. All districts shared in the gain; in southeast Alaska the output increased from 2,087,951 to 3,295,093 cases, or about 58 percent; in central Alaska from 1,485,994 cases to 2,327,418 cases, or about 57 percent; and in western Alaska from 1,651,659 cases to 1,859,319 cases, or about 13 percent. In Alaska as a whole the pack of each species was larger in 1934 than in the preceding year; reds increased from 2,180,283 cases to 2,628,016 cases, or nearly 21 percent; pinks from 2,182,551 to 3,824,193 cases, or 75 percent; cohos from 162,568 to 236,117 cases, or 45 percent; chums from 658,789 to 740,641 cases, or 12 percent; and kings from 41,413 to 52,863 cases, or about 28 percent.

Data are included in the following tables to show comparison of the 1934 pack with the average for the 5 preceding years, 1929 to 1933, by cases of each species and by districts. All species except king salmon show a gain over the 5-year average. By districts, the pack in southeast Alaska increased 38 percent, in central Alaska 37 percent, and in western Alaska 58 percent, making a net increase of 42 percent over the 5-year average for the entire output.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1934

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	1,117	1,228	1,803	4,148
Natives	1,125	498	438	2,061
Chinese	2			2
Japanese			3	3
Filipinos	6		3	9
Mexican	1			1
Miscellaneous [1]		3		3
Total	2,251	1,729	2,247	6,227
Shoresmen:				
Whites	1,893	1,525	1,555	4,973
Natives	2,009	696	131	2,836
Chinese	157	238	477	872
Japanese	556	342	367	1,265
Filipinos	1,276	1,090	596	2,962
Mexicans	12	1	713	726
Negroes	2	1	22	25
Miscellaneous [1]	14		43	57
Total	5,919	3,893	3,904	13,716
Transporters:				
Whites	658	597	375	1,630
Natives	6	62	3	71
Japanese	6			6
Filipinos	4			4
Total	674	659	378	1,711
Total:				
Whites	3,668	3,350	3,733	10,751
Natives	3,140	1,256	572	4,968
Chinese	159	238	477	874
Japanese	562	342	370	1,274
Filipinos	1,286	1,090	599	2,975
Mexicans	13	1	713	727
Negroes	2	1	22	25
Miscellaneous [1]	14	3	43	60
Grand total	8,844	6,281	6,529	21,654
Wages paid shoresmen	$1,408,624	$1,097,830	$1,118,230	$3,624,684
Wages paid transporters	272,401	284,246	150,583	707,230
OPERATING UNITS				
Plants:				
Shore canneries	42	39	21	102
Floating canneries:				
Power vessels	1	3	1	5
Net tonnage	245	5,253	1,424	6,922
Barges	1	2		3
Net tonnage	1,092	883		1,975
Total plants operated	44	44	22	110
Vessels:				
Power, over 5 tons	361	165	82	608
Net tonnage	7,298	5,507	24,556	37,361
Launches	105	161	26	292
Power dories	23	27	1	51
Gill-net boats	108	135	1,027	1,270
Seine skiffs	126	169	6	301
Other rowboats and skiffs	628	575	166	1,369
Lighters and scows	189	199	139	527
Houseboats	15	2	27	44
Pile drivers	22	29	14	65
Pile pullers	2	6		8
Rigging scows	35	10		45
Apparatus:				
Purse seines	342	144	6	492
Fathoms	57,290	17,400	1,680	76,370
Beach seines	4	121		125
Fathoms	400	12,417		12,817
Gill nets	295	958	1,489	2,742
Fathoms	20,790	52,110	146,360	219,260
Traps, driven	28	134		162
Traps, floating	262	35		297

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[1] Kanakas, Koreans, Puerto Ricans, etc.

Output and value of canned salmon in Alaska in 1934 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
½-pound flat	5,067	$40,540	718	$5,470			5,785	$46,010
1-pound flat	6,826	38,958	1,457	7,701			8,283	46,659
1-pound tall	146,634	755,434	74,196	379,374	1,219	$6,273	222,049	1,141,081
Total	158,527	834,932	76,371	392,545	1,219	6,273	236,117	1,233,750
Chum, or keta:								
½-pound flat	2,237	12,941	61	346			2,298	13,287
1-pound tall	391,975	1,422,980	313,172	1,138,195	33,196	127,383	738,343	2,688,558
Total	394,212	1,435,921	313,233	1,138,541	33,196	127,383	740,641	2,701,845
Pink, or humpback:								
½-pound flat	27,675	182,478	1,118	6,981			28,793	189,459
1-pound flat	1,621	7,134	47	188			1,668	7,322
1-pound tall	2,593,066	10,633,959	1,198,707	4,826,930	1,959	8,132	3,793,732	15,469,021
Total	2,622,362	10,823,571	1,199,872	4,834,099	1,959	8,132	3,824,193	15,665,802
King, or spring:								
½-pound flat	4,257	42,719	4,240	43,717	1,486	13,081	9,983	99,517
1-pound flat	4,633	34,426	3,609	33,695	1,972	12,226	10,214	80,347
1-pound tall	6,704	37,288	20,623	113,795	5,339	30,952	32,666	182,035
Total	15,594	114,433	28,472	191,207	8,797	56,259	52,863	361,899
Red, or sockeye:								
½-pound flat	22,196	220,224	62,516	615,161	3,339	32,379	88,051	867,764
1-pound flat	11,904	92,854	58,589	428,947	2,937	22,338	73,430	544,139
1-pound tall	70,298	459,108	588,365	3,852,068	1,807,872	11,925,575	2,466,535	16,236,751
Total	104,398	772,186	709,470	4,896,176	1,814,148	11,980,292	2,628,016	17,648,654
Grand total	3,295,093	13,981,043	2,327,418	11,452,568	1,859,319	12,178,339	7,481,830	37,611,950

[1] Cases containing ½-pound cans have been reduced ½ in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of forty-eight 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1929 to 1934 [1]

BY SPECIES

Product	1929	1930	1931	1932	1933	Average for 5-year period, 1929–1933	1934	Percentage increase or decrease in 1934, as compared with 5-year average
Coho, or silver:								
¼-pound flat		371				74		−100.00
½-pound flat	7,880	18,808	9,962	3,442	3,367	8,692	5,785	−33.43
1-pound flat	6,730	5,926	2,902	1,763	4,657	4,396	8,283	+88.42
1-pound tall	157,346	307,317	157,014	142,970	154,544	183,838	222,049	+20.79
Total	171,956	332,422	169,878	148,175	162,568	197,000	236,117	+19.86
Chum, or keta:								
½-pound flat	4,961	8,384	4,242	624	658	3,774	2,298	−39.11
1-pound flat			35			7		−100.00
1-pound tall	859,551	591,550	529,579	819,932	658,131	691,748	738,343	+6.74
Total	864,512	599,934	533,856	820,556	658,789	695,529	740,641	+6.49
Pink, or humpback:								
¼-pound flat		1,113				222		−100.00
½-pound flat	44,762	81,064	46,524	7,166	14,857	38,875	28,793	−25.93
1-pound flat	3,910	4,867	4,410			2,637	1,668	−36.75
1-pound tall	2,522,985	3,101,490	2,902,926	2,105,979	2,167,694	2,560,215	3,793,732	+48.18
Total	2,571,657	3,188,534	2,953,860	2,113,145	2,182,551	2,601,949	3,824,193	+46.97

[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

Output of canned salmon in Alaska, in cases, 1929 to 1934—Continued

BY SPECIES—Continued

Product	1929	1930	1931	1932	1933	Average for 5-year period, 1929–1933	1934	Percentage increase or decrease in 1934, as compared with 5-year average
King, or spring:								
½-pound flat	16,320	17,840	13,208	11,713	9,955	13,807	9,983	−27.70
1-pound flat	26,808	23,686	16,721	14,800	10,021	18,407	10,214	−44.51
1-pound tall	28,979	18,396	21,938	43,013	21,437	26,753	32,666	+22.10
Total	72,107	59,922	51,867	69,526	41,413	58,967	52,863	−10.35
Red, or sockeye:								
¼-pound flat		370				74		−100.00
½-pound flat	100,136	110,605	58,178	47,707	53,638	74,053	88,051	+18.90
1-pound flat	75,326	62,972	41,002	75,524	60,052	62,975	73,430	+16.60
1-pound tall	1,514,465	677,567	1,595,098	1,979,850	2,066,593	1,566,715	2,466,535	+57.43
Total	1,689,927	851,514	1,694,278	2,103,081	2,180,283	1,703,817	2,628,016	+54.24
Grand total	5,370,159	5,032,326	5,403,739	5,254,483	5,225,604	5,257,262	7,481,830	+42.31
BY DISTRICTS AND SPECIES								
Southeast Alaska:								
Coho, or silver	97,847	155,652	88,455	87,038	95,805	104,959	158,527	+51.04
Chum, or keta	290,797	283,478	274,248	579,443	424,861	370,565	394,212	+6.38
Pink, or humpback	1,542,615	2,309,976	2,013,442	1,379,006	1,478,013	1,744,611	2,622,362	+50.31
King, or spring	7,000	6,939	14,896	23,624	8,146	12,121	15,594	+28.65
Red, or sockeye	162,952	221,241	147,895	138,942	81,126	150,431	104,398	−30.60
Total	2,101,211	2,977,286	2,538,936	2,208,053	2,087,951	2,382,687	3,295,093	+38.29
Central Alaska:								
Coho, or silver	71,330	173,352	81,331	60,674	65,307	90,399	76,371	−15.52
Chum, or keta	497,774	284,751	193,053	147,410	207,879	266,173	313,233	+17.68
Pink, or humpback	1,025,652	859,761	940,418	724,051	704,538	850,884	1,199,872	+41.01
King, or spring	35,661	32,060	27,599	32,302	23,786	30,282	28,472	−5.98
Red, or sockeye	454,086	268,621	439,153	660,161	484,484	461,301	709,470	+53.80
Total	2,084,503	1,618,545	1,681,554	1,624,598	1,485,994	1,699,039	2,327,418	+36.98
Western Alaska:								
Coho, or silver	2,779	3,418	92	463	1,456	1,642	1,219	−25.76
Chum, or keta	75,941	31,705	66,555	93,703	26,049	58,791	33,196	−43.54
Pink, or humpback	3,390	18,797		10,088		6,455	1,959	−69.65
King, or spring	29,446	20,923	9,372	13,600	9,481	16,564	8,797	−46.89
Red, or sockeye	1,072,889	361,652	1,107,230	1,303,978	1,614,673	1,092,084	1,814,148	+66.12
Total	1,184,445	436,495	1,183,249	1,421,832	1,651,659	1,175,536	1,859,319	+58.17
Grand total	5,370,159	5,032,326	5,403,739	5,254,483	5,225,604	5,257,262	7,481,830	+42.31

Relative importance of each species of canned salmon within each district in 1934

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	4.8	11.9	79.6	0.5	3.2	100.0
Central Alaska	3.3	13.5	51.5	1.2	30.5	100.0
Western Alaska	.0	1.8	.1	.5	97.6	100.0
All Alaska	3.2	9.9	51.1	.7	35.1	100.0

Relative importance of each district in the production of each species of salmon canned in 1934

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	67.1	53.2	68.6	29.5	4.0	44.0
Central Alaska	32.4	42.3	31.4	53.9	27.0	31.1
Western Alaska	.5	4.5	.0	16.6	69.0	24.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Average annual price per case of forty-eight 1-pound cans of salmon, 1924 to 1934

Product	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Coho, or silver	$6.83	$9.72	$8.40	$8.51	$7.12	$7.59	$8.26	$6.51	$4.12	$5.20	$5.23
Chum, or keta	4.68	4.44	5.01	5.47	6.06	5.35	3.60	3.19	2.79	4.12	3.65
Pink, or humpback	4.93	5.28	5.39	5.87	6.56	6.06	4.17	3.46	3.14	4.52	4.10
King, or spring	8.89	11.91	10.37	11.25	11.13	11.92	13.32	9.40	5.46	7.51	6.85
Red, or sockeye	9.53	13.12	9.89	12.08	9.41	10.71	12.57	9.20	5.61	6.71	6.72

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1933. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.

Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

Chignik.—Canneries located at Chignik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.

Prince William Sound.—Resurrection Bay to Point Whitshed.

Copper and Bering Rivers.—Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Yakutat Bay to and including Dry Bay.

Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof Islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.

Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.

Sumner Strait-Dixon Entrance.—Southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and including all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.

West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1934, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage increase over 1933
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	1,219	32,222	1,959	8,580	1,726,769	1,770,749	9.09
Port Moller and Herendeen Bay		974		217	87,379	88,570	211.44
Ikatan-Shumagin Islands	25,418	182,666	312,762	4,639	173,136	698,621	59.34
Chignik	2,476	13,417	28,406	157	122,326	166,782	90.83
Kodiak-Afognak Islands	9,151	73,588	420,684	344	151,924	655,691	31.55
Cook Inlet	25,665	9,141	48,186	19,148	154,697	256,837	82.33
Prince William Sound	13,661	34,421	389,676	715	14,549	453,022	82.56
Copper and Bering Rivers			158	3,469	92,838	96,465	32.67
Yakutat and Dry Bay	30,316	311	4,788	4,633	19,407	59,455	63.87
Icy Strait-Lynn Canal	20,291	97,572	340,032	3,216	32,035	493,146	14.21
Chatham Strait-Frederick Sound	27,627	185,613	442,709	912	9,237	666,098	32.37
Sumner Strait-Dixon Entrance	46,493	82,038	1,278,619	850	35,409	1,443,409	83.51
West coast, Prince of Wales Island	33,800	28,678	556,214	5,983	8,310	632,985	91.77
Total	236,117	740,641	3,824,193	52,863	2,628,016	7,481,830	43.18

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

MILD CURING

Operations in the salmon mild-curing business in Alaska were considerably affected by the longshoremen's strike on the Pacific coast and by disagreements over prices between the trollers and packers. Because of the delay in receiving shipments of tierces and salt, no mild curing was undertaken at the mouth of the Kuskokwim River during the season, and the salteries on the Yukon were forced to close down by June 29. The industry in southeast Alaska also was hindered by this disruption of shipping, and although a settlement with respect to Alaska shipments was reached early in June, operations were not resumed because the trollers were dissatisfied with prices offered.

The trollers' strike continued during June and July and was finally settled through an arrangement whereby many of the trollers formed a cooperative marketing association, which contracted for the sale of salmon to the Alaska Coast Fisheries, a subsidiary of the Atlantic & Pacific Packing Co. Under this agreement the fishermen received an advance payment at a specified rate upon delivery of the fish, and a further payment from the proceeds of sale after deduction of handling charges. The motor ship *Donna Lane*, which had been engaged in the herring fishery in the previous year, was used by the cooperative association for splitting and freezing purposes. When fishing was resumed on August 6 the fish were of excellent quality and brought good prices. Large catches were made for about 2 weeks, after which the run decreased.

Eighteen plants in southeast Alaska and four in the western district were engaged in the industry. The reports of these companies, together with the census of the trolling fleet by the Bureau, show a total of 1,281 persons employed.

The total output of mild-cured salmon was 3,532,800 pounds, valued at $616,111, a decrease of 390,400 pounds in quantity and $6,717 in value, as compared with the production in 1933.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1934

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	901	2	15	918
Natives	139		23	162
Chinese	2			2
Japanese	1			1
Filipinos	12			12
Mexicans	2			2
Korean	1			1
Total	1, 058	2	38	1, 098
Shoresmen:				
Whites	106		6	112
Natives	4		49	53
Total	110		55	165
Transporters:				
Whites	13		1	14
Natives			4	4
Total	13		5	18
Grand total	1, 181	2	98	1, 281
Wages paid shoresmen	$48, 984		$5, 215	$54, 199
Wages paid transporters	$6, 727		$1, 178	$7, 905
OPERATING UNITS				
Plants:				
Shore	14		3	17
Floating:				
Power vessel	1			1
Net tonnage	1, 597			1, 597
Barges	3		1	4
Net tonnage	720		633	1, 353
Total plants operated	18		4	22
Vessels:				
Power, over 5 tons	212		1	213
Net tonnage	1, 579		40	1, 61
Launches	555	1	3	559
Power dories			2	2
Gill-net boats			14	14
Rowboats and skiffs	106	1	6	113
Lighters and scows	2		4	6
House-boat	1			1
Apparatus:				
Purse seine		1		1
Fathoms		75		75
Gill nets	9	1	51	61
Fathoms	225	25	2, 271	2, 521
Lines	3, 207			3, 207

Products of Alaska salmon mild-curing industry in 1934

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 230, 400	$22, 953	[2] 5, 600	$400			[3] 236, 000	$23, 353
Chum, or keta	105, 600	7, 280					[4] 105, 600	7, 280
King, or spring	[5] 2, 821, 600	528, 556	[6] 7, 200	898	[7] 357, 600	$55, 484	[8] 3, 186, 400	584, 938
Red, or sockeye	4, 800	540					[9] 4, 800	540
Total	3, 162, 400	559, 329	12, 800	1, 298	357, 600	55, 484	3, 532, 800	616, 111

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[1] 288 tierces.

[2] 7 tierces.

[3] 295 tierces.

[4] 132 tierces.

[5] 3,527 tierces.

[6] 9 tierces.

[7] 447 tierces.

[8] 3,983 tierces.

[9] 6 tierces.

PICKLING

Several small plants in the central district, chiefly on islands along the south side of the Alaska Peninsula, were engaged in the pickling of salmon in 1934, but the industry as a whole was on a very limited scale. Although red salmon were plentiful in western Alaska, almost the entire catch went into the canned product, and the pickling of salmon was entirely incidental to canning and other branches of the fisheries. The production in the western district was but little more than half that for central Alaska, and no output whatever was reported for southeast Alaska.

Thirty-one persons were employed in the industry, a decrease of 75 from the previous year. The total output was 387,450 pounds, valued at $28,987, as compared with 1,034,950 pounds valued at $73,920 in 1933.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1934 [1]

Items	Number	Items	Number	Items	Number
PERSONS ENGAGED		PERSONS ENGAGED—con.		OPERATING UNITS—con.	
Fishermen:		Wages paid shoresmen	$1,251	Apparatus:	
Whites	22			Beach seines	15
Natives	4	OPERATING UNITS		Fathoms	861
				Gill nets	27
Total	26	Plants, shore	18	Fathoms	805
		Vessels:			
Shoresmen:		Power, over 5 tons	1		
Whites	4	Net tonnage	5		
Native	1	Launches	4		
		Power dories	7		
Total	5	Gill-net boats	3		
		Seine skiffs	13		
Grand total	31	Rowboats and skiffs	12		
		Lighters and scows	2		

[1] Except for 2 gill nets, aggregating 125 fathoms, from western Alaska, all items are credited to the central district.

Products of Alaska salmon-pickling industry in 1934

Species	Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	62,800	$3,743			62,800	$3,743
Chum, or keta			1,450	$72	1,450	72
King, or spring	12,000	1,115	34,400	3,473	46,400	4,588
Red, or sockeye	179,600	12,574	97,200	8,010	276,800	20,584
Total	254,400	17,432	133,050	11,555	387,450	28,987

FRESH SALMON

Two operators in southeast Alaska were engaged primarily in the fresh-salmon business and gave employment to 16 shoresmen and 6 transporters. In addition, 7 operators in the southeastern district produced fresh salmon in connection with mild curing or other branches of the fisheries. The total products amounted to 1,385,789 pounds, valued at $69,837, as compared with 559,287 pounds valued at $30,601 in 1933—an increase of about 148 percent in quantity and 128 percent in value.

These figures do not include the salmon sold to halibut boats for bait nor those used for fox feed, which are shown under miscellaneous salmon products.

Products of the Alaska fresh-salmon industry in 1934

Species	Pounds	Value
Coho, or silver	1, 010, 754	$50, 479
Chum, or keta	6, 196	116
Pink, or humpback	125, 148	1, 790
King, or spring	76, 340	7, 896
Red, or sockeye	167, 351	9, 556
Total	1, 385, 789	69, 837

FREEZING

The freezing of salmon in Alaska was largely incidental to mild curing and was carried on only in the southeastern district. One cold-storage plant whose chief product was frozen salmon gave employment to 20 white shoresmen. The total output was 5,316,574 pounds, valued at $334,812, as compared with 4,236,252 pounds, valued at $221,382, in 1933—an increase of approximately 26 percent in quantity and 51 percent in value.

Products of the Alaska frozen-salmon industry in 1934

Species	Pounds	Value
Coho, or silver	3, 930, 192	$229, 852
Chum, or keta	67, 730	2, 332
Pink, or humpback	95	1
King, or spring	1, 274, 257	100, 096
Red, or sockeye	44, 300	2, 531
Total	5, 316, 574	334, 812

DRY-SALTED, DRIED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

Several operators in southeast Alaska reported the sale of salmon to halibut boats for bait. Small quantities of dry-salted, dried, and kippered salmon were prepared in central Alaska in conjunction with canning and pickling operations. In the central district, also, a limited amount of fresh salmon for fox feed was reported.

In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,404,000 pounds of chum salmon were dried, valued at $56,280; 624 pounds of kings were smoked and canned, valued at $140; and 200 pounds of kings were kippered, valued at $20. In this region 12 whites and 635 natives engaged in the fishery, and the apparatus used consisted of 262 wheels, 834 gill nets of 11,870 fathoms, 1 dory, and 50 rowboats and skiffs.

Production of dry-salted, dried, and other miscellaneous salmon products in Alaska in 1934

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted: Red, or sockeye			26,400	$1,584			26,400	$1,584
Dried:								
Coho, or silver			1,500	30			1,500	30
Chum, or keta			3,500	70	1,404,000	$56,280	1,407,500	56,350
Pink, or humpback			3,500	70			3,500	70
Total			8,500	170	1,404,000	56,280	1,412,500	56,450
Kippered:								
Coho, or silver			300	15			300	15
King, or spring					200	20	200	20
Red, or sockeye			250	25			250	25
Total			550	40	200	20	750	60
Smoked and canned: King, or spring					624	140	624	140
Fresh, for bait: Pink, or humpback	24,600	$150					24,600	150
Frozen, for bait: Chum, or keta	99,700	450					99,700	450
Fresh, for fox feed: Pink, or humpback			2,000	10			2,000	10
Grand total	124,300	600	37,450	1,804	1,404,824	56,440	1,566,574	58,844

BYPRODUCTS

Two reduction plants in southeast Alaska prepared salmon byproducts, giving employment to 17 white shoresmen and 7 white transporters. One of these plants, that of the Salmoil Corporation at Mud Bay, was destroyed by fire in July. In central Alaska the manufacture of meal and oil was again carried on by a salmon cannery at Karluk in conjunction with its canning operations. The total production was 1,015,560 pounds of fertilizer, valued at $15,233, and 33,720 gallons of oil, valued at $13,701, as compared with 913,358 pounds of fertilizer, valued at $14,679, and 35,700 gallons of oil, valued at $5,748, in 1933—an increase of 11 percent in the amount of fertilizer and a decrease of about 6 percent in the output of oil.

HERRING

Although abundant runs of herring appeared on most of the important fishing grounds of Alaska in 1934, many of the fish were not of suitable size for curing. As a result, there was a sharp decline in the output of Scotch-cured herring, while the production of meal and oil was the largest in the history of the industry. The increase in the latter products was particularly marked in the Prince William Sound region.

The Kodiak Island area failed to maintain the position it had held for 2 years as the chief producing center for Scotch-cured herring, and instead dropped to the lowest place, not counting the Cook Inlet area, where the output was negligible. It was said that salteries in the Kodiak region found a much heavier waste in packing than in previous years, because a large percentage of the herring were too small for curing. As yet, no herring reduction plants have been operated in this part of Alaska. The herring run in Unalaska Bay began on June 15 and continued to July 25, when it stopped abruptly.

The total production of Scotch-cured herring in the Kodiak area in 1934 was 1,455,875 pounds, as compared with 4,130,875 pounds in the previous year. In southeast Alaska the output declined from 3,874,703 pounds in 1933 to 2,137,075 pounds in 1934, and in the Prince William Sound area from 3,046,125 pounds to 1,790,750 pounds. Only in the Aleutian Islands district was there a noticeable increase, the pack for 1934 amounting to 2,015,375 pounds, as compared with 1,589,250 pounds in 1933. Small quantities of cured herring were prepared at Golovin Bay and Cook Inlet. No production was reported for Chignik.

Twenty-two concerns handled herring in southeastern Alaska in 1934, an increase of three over the number shown for the previous year. Five were cold-storage plants that froze herring for bait, and eight engaged only in the production of herring for bait. The following companies operated saltery and reduction plants in this district:

Arentsen & Co	Big Port Walter.
Atlas Packing Corporation	Deep Cove.
Buchan & Heinen Packing Co	Port Armstrong.
Chatham Strait Fish Co	New Port Walter.
Northwestern Herring Co	Port Conclusion.
Port Herbert Packing Co	Port Herbert.
Storfold & Grondahl Packing Co	Washington Bay.

In central Alaska nine operators engaged in pickling herring, practically all the pack being prepared in the Prince William Sound and Kodiak areas. One firm in the latter district produced bait herring only. The more important operators in the district were as follows:

Salteries:	
Apex Fish Co	Iron Creek.
Blue Island Packing Co	Blue Fox Bay.
David Buvick	Shuyak Strait.
San Marco Fish Co. (Floating)	Kodiak Island.
Saltery and reduction plants:	
Chatham Strait Fish Co	Crab Bay.
Evans Bay Packing Co., Inc	Port Benny.
Johnson Fisheries Co	Thumb Bay.

The chief operators in the western district were the following, all of whom produced Scotch-cured herring, while two prepared Norwegian-cured herring also, and several put up bloater stock:

Austnes & Rod	Unalaska.
Campbell & Dougal	Dutch Harbor.
Ed Jacobsen & Co	Do.
Jorden Colombos Lamadies	Do.
Northwestern Herring Co	Do.
Peterson & Jorgensen Packing Co	Do.
Polar Packing Co	Unalaska.
Olaf Olsen	Do.
Odin Isaacson	Do.

Biological studies of the Alaska herring were continued by Dr. George A. Rounsefell and Edwin H. Dahlgren. Their investigations were confined mainly to the herring fisheries of Chatham Strait, in the southeastern district.

STATISTICAL SUMMARY

Eight hundred and eighty-five persons engaged in the herring industry in 1934, as compared with 988 in 1933. The number of plants decreased from 31 to 26. Products of the fishery were valued at $1,603,024, an increase of $200,830, or 14 percent over 1933, when the total value was $1,402,194. Scotch-cured herring decreased from 12,651,328 pounds, valued at $586,331, to 7,409,200 pounds, valued at $445,476, or 41 percent in quantity and 24 percent in value. Herring for bait increased from 4,471,890 pounds, valued at $38,509, to 6,391,950 pounds, valued at $52,259, or 43 percent in quantity and 36 percent in value. Meal increased about 27 percent both in quantity and in value, and oil increased about 20 percent in quantity and 61 percent in value.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1934

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	301	84	17	402
Natives	1	3	9	13
Total	302	87	26	415
Shoresmen:				
Whites	234	147	42	423
Natives		10	26	36
Total	234	157	68	459
Transporters: Whites		9	2	11
Grand total	536	253	96	885
Wages paid shoresmen	$89,550	$51,166	$17,425	$158,141
Wages paid transporters		$9,544	$500	$10,044
OPERATING UNITS				
Plants:				
Shore	7	6	10	23
Floating:				
Power vessel		1		1
Net tonnage		7		7
Sailing vessel		1		1
Net tonnage		1,068		1,068
Scow		1		1
Total plants operated	7	9	10	26
Vessels:				
Power, over 5 tons	44	18	1	63
Net tonnage	1,410	461	5	1,876
Launches	2	1	1	4
Power dories			6	6
Gill-net boats			2	2
Seine skiffs	20	11		31
Other rowboats and skiffs	20	8	4	32
Lighters and scows	1	1		2
Pile drivers	1	1		2
Apparatus:				
Purse seines	46	14		60
Fathoms	7,567	2,245		9,812
Gill nets		1	44	45
Fathoms		50	1,770	1,820
Pound seines	9	2		11
Pounds	9	11		20

Products of Alaska herring industry in 1934

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	2,117,160	$21,201	1,241,625	$10,663			3,358,785	$31,864
Frozen, for bait	3,009,765	20,229					3,009,765	20,229
Pickled, for bait			23,400	166			23,400	166
Pickled, for food:								
Scotch cure	2,137,075	119,791	3,251,875	225,323	2,020,250	$100,362	7,409,200	445,476
Norwegian cure	21,790	965			208,750	7,333	230,540	8,298
Roused for food (bloater stock)					513,050	16,854	513,050	16,854
Spiced	2,600	390	40,400	770			43,000	1,160
Dry salted					80,400	2,701	80,400	2,701
Meal	19,956,468	316,604	7,954,000	125,613			27,910,468	442,217
Oil	[1] 19,619,235	446,557	[2] 8,208,375	187,502			[3] 27,827,610	634,059
Total	46,864,093	925,737	20,719,675	550,037	2,822,450	127,250	70,406,218	1,603,024

[1] 2,615,898 gallons. [2] 1,094,450 gallons. [3] 3,710,348 gallons.

HALIBUT

The American halibut fleet operated in 1934 under a program for controlling production which was a modification of the plan followed in 1933. This program involved restrictions on the number of trips made by each vessel and on the catch per man, but specific dates upon which the vessels should land their catches were not assigned as in 1933. In general this program was only moderately successful, as it was carried out fully in but one area. In spite of the lack of complete cooperation, the market for halibut in 1934 was much more stable than in 1933.

There was a very active demand for halibut livers during 1934, and virtually all of those landed were disposed of under contract at a price about 37 percent above that offered in the preceding year. Considerable profit has resulted to the fishermen in recent years through the pharmaceutical use of halibut liver extracts.

The halibut fishery was governed by regulations of the International Fisheries Commission. Fishing began on March 1 and ended in area no. 2 on August 19 and in areas 1 and 3 on October 27, at which dates the quotas prescribed by regulation were reached.

Biological investigations of the Pacific halibut were continued under the direction of Dr. William F. Thompson. These investigations are being directed primarily toward a determination of the extent to which the stock of halibut must yet be increased in order that there will be sufficient spawn to populate the banks to their proper maximum. The halibut vessel *Eagle* was chartered during the winter of 1933–34 in connection with studies in the Gulf of Alaska.

STATISTICAL SUMMARY

There were 602 persons employed in the Alaska halibut industry in 1934—an increase of 33 over the number reported for the preceding year, and products amounted to 13,221,338 pounds, valued at $804,785. This production represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut in Alaska totaled 7,151,669 pounds having a value of $398,337. In 1933 the landings of the Alaska fleet were 14,068,911 pounds valued at $726,362, and landings in Alaska amounted to 6,779,768 pounds valued at $316,310. Fares of the Alaska fleet in 1934 declined 847,573 pounds, or 6 percent in quantity, but increased 11 percent in value over 1933. The landings in Alaska ports in 1934 increased 371,901 pounds or about 5 percent in quantity and about 26 percent in value over the preceding year.

These statistics were compiled from data collected by the International Fisheries Commission and by agents of the Bureau. The amount of halibut livers landed by the Alaska fleet was not reported, but it was stated that there were altogether about 850,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $175,000, landed at Alaska and Pacific coast ports during 1934 by American vessels.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1934

Items	Total	Items	Total
PERSONS ENGAGED		OPERATING UNITS	
Fishermen: Whites	526	Vessels:	
Shoresmen:		Power, over 5 tons	92
Whites	75	Net tonnage	1,636
Native	1	Launches	32
Total	76	Skates of lines	2,498
Grand total	602		
Wages paid shoresmen	$32,805		

NOTE.—No dories are shown, as none were actually engaged in fishing. Heretofore the figures have included life boats.

Products of the Alaska halibut fishery in 1934

Products	Pounds	Value
Fresh (including local)	7,253,775	$444,525
Frozen	5,967,563	360,260
Total	13,221,338	804,785

COD

Cod-fishing operations were again carried on from shore stations in the Shumagin and Aleutian Islands region and resulted in a larger output than for any other year since 1929. Fifty-four persons, consisting of 29 whites and 25 natives, were engaged in the industry, a gain of 19 over the number employed in 1933. Products of the shore fishery were as follows: 352,345 pounds of dry-salted cod, valued at $13,158; 117,160 pounds of pickled cod, valued at $4,345; and 23,400 pounds of stockfish, valued at $2,403—a total of 492,905 pounds, valued at $19,906, as compared with 338,475 pounds, valued at $12,907, in 1933.

Seven sailing vessels comprised the Bering Sea offshore fleet, the products of which are not included with the Alaska fisheries output because the vessels operate from and land their fares in ports of the Pacific Coast States. Of these, the *C. A. Thayer* (390 tons), *John A* (235 tons), and *Sophie Christenson* (570 tons) were operated by the Pacific Coast Codfish Co.; the *Azalea* (365 tons) and *Wawona* (413 tons) by the Robinson Fisheries Co.; and the *Louise* (328 tons) and *William H. Smith* (496 tons) by the Union Fish Co.

Products of the offshore fishery were 4,930,701 pounds of dry-salted cod, valued at $212,510, and 11,675 pounds of tongues, valued at $856—a total of 4,942,376 pounds, valued at $213,366, as compared with 4,890,469 pounds, valued at $166,601, in 1933. The offshore fishery employed 199 persons, or 3 more than in the previous year.

WHALES

The American Pacific Whaling Co. reopened its whaling station at Akutan, which had been idle since 1930, and also operated again at Port Hobron. Seven steam whalers were used by the 2 plants, and employment was given to 210 persons, of whom 188 were whites and 22 natives. There were 465 whales taken during the season, consisting of 232 finback, 166 humpback, 44 sulphur bottom, 21 sperm, and 2 sei whales. This is an increase of 283 over the number taken in the previous year.

Products of the whale fishery were 810,950 gallons of whale oil, valued at $196,670; 76,500 gallons of sperm oil, valued at $16,830; 945 tons of fertilizer from meat, valued at $27,405; and 404 tons of bone fertilizer, valued at $10,100—a total value of $251,005, as compared with $68,989 in 1933.

CLAMS

In the Prince William Sound area 6 plants canned clams, producing about 97 percent of the total Alaska output. The pack limit, as specified by the regulations, of 552,000 pounds for the first half year was reached on June 21, and the summer closed season extended from that date through August 15. The limit of 168,000 pounds for the fall pack was reached in less than 1 month and the season closed on September 11. Operators in this district were the Pioneer Canneries, Inc. and Strand-Jensen Fisheries Co., who prepared the bulk of the pack in connection with their salmon-canning activities, the Gulf Packing Co., which engaged primarily in canning crabs, and Dale and Deville, E. A. Haltness, and S. E. Smith Packing Co.

Notwithstanding the good showing from the Prince William Sound district, the total output of clams in Alaska in 1934 dropped to the lowest level since 1929, due to almost negligible operations in the Kodiak and Cook Inlet areas. Reports indicate that clams were abundant on the mainland beaches in the Kodiak area, but only one plant, the Hand Packing Co., at Halibut Bay, was engaged in the industry there, and that for but a short time. On Cook Inlet the clam pack was produced by the Kustatan Packing Co. and the Ninilchik Packing Co., both of which were engaged primarily in canning salmon. A small quantity of hard-shell clams was packed in southeast Alaska at the salmon cannery of Lane Brothers, on Moira Sound.

Employment was given to 342 persons, of whom 306 were whites, 21 natives, 10 Japanese, and 5 Filipinos. The output consisted of 31,796 cases, containing 782,388 pounds (780,684 pounds of razor clams, and 1,704 pounds of butter clams), valued at $188,666. This is a decrease of about 25 percent in quantity and 23 percent in value as compared with figures for 1933, when clam products amounted to 1,045,920 pounds, valued at $246,338.

Products of the Alaska clam industry in 1934

Item	Cases	Pounds	Value
Minced:			
½-pound cans (48 to case)	29,151	699,624	$171,508
10-ounce cans (48 to case)	1,947	58,410	11,022
1-pound cans (48 to case)	81	3,888	624
20-ounce cans (24 to case)	97	2,910	582
Whole:			
½-pound cans (48 to case)	76	1,824	912
10-ounce cans (48 to case)	310	9,300	2,410
1-pound cans (48 to case)	134	6,432	1,608
Total	31,796	782,388	188,666

SHRIMP

Operations in the shrimp industry were carried on in 1934 by the same companies as in the previous year. Three plants in southeast Alaska (the Alaskan Glacier Sea Food Co. at Petersburg, and the Reliance Shrimp Co. and Stikine Sea Food Co. at Wrangell) engaged primarily in this business and prepared the bulk of the product. A small pack of canned shrimp in glass jars was put up by John F. Willers, who operated at the plant of the Alaskan Glacier Sea Food Co. Some prospecting was carried on in the Yakutat district during July and August, and it was reported that shrimp were found in many places but not on suitable trawling grounds. In the central district the Northern Sea Food Co. at Cordova produced a limited quantity of shrimp meat in connection with the canning of crabs.

There were 138 persons engaged in the industry, of whom 22 were whites, 70 natives, 27 Japanese, 14 Filipinos, 2 Mexicans, 2 Koreans, and 1 Chinese. Products consisted of 377,223 pounds of shrimp meat, valued at $119,307; 3,780 pounds of fresh shrimp in shell, valued at $525; and 453 pounds of canned shrimp meat (93 cases of 6½-ounce jars, 12 jars to the case), valued at $279—a total of 381,456 pounds, valued at $120,111. Comparable figures for 1933 show a production of 319,052 pounds, valued at $102,382.

CRABS

Influenced by favorable market conditions, the production of canned crabs in Alaska in 1934 was the largest in the history of the industry. Eleven companies handled crabs, as compared with 8 in the previous year. Of these, 6 operated in southeast Alaska, as follows—the Alaskan Glacier Sea Food Co., at Petersburg and Hooniah; V. L. Boardway & Co., and Polar Sea Foods, Inc., new outfits at Wrangell and Tenakee Inlet, respectively; Kaylor-Otness, Inc., which purchased the cannery of the Northern Sea Food Co. at Petersburg; Polar Star Packing Co., Ltd., in Peril Strait, aboard a scow that had formerly been used as a salmon cannery by the Diamond K Packing Co.; and the Stikine Sea Food Co., primarily in the shrimp business, at Wrangell.

Five companies operating in the vicinity of Cordova were the Alaska Icepak Corporation, which took over the plant previously belonging to the Alaska Sea Products, Inc.; the Gulf Packing Co.; the Northern Sea Food Co.; the S. E. Smith Packing Co., whose operations were incidental to the canning of clams; and the Strand-Jensen Fisheries Co., which put up crabs for the first time in conjunction with its salmon-canning operations.

Two hundred and eighty persons were engaged in the industry, of whom 235 were whites, 39 natives, 5 Filipinos, and 1 Japanese. Products consisted of 544,311 pounds canned (19,727 cases of ½-pound cans, 1,066 cases of 1-pound cans, and 1,010 cases of 6½-ounce cans, 48 cans to the case), valued at $184,052; 71,962 pounds of cold-packed meat, valued at $22,418; and 937 dozen crabs in the shell, valued at $1,193. The total value of products in 1934 was $207,663, as compared with $155,580 in 1933, an increase of 33 percent.

JAPANESE VESSELS IN BERING SEA

In 1934 there were 3 Japanese cannery vessels engaged in canning crab meat in offshore waters of Bering Sea, as compared with 4 such vessels in the previous year. The floating canneries reported in Bering Sea were the *Toten Maru* (formerly the *Nagato Maru*), the *Kasada Maru*, and the *Taihoku Maru*, each of which was accompanied by the usual number of tenders. Two beam trawlers, the *Kitami Maru* and *Adzuchi Maru*, of about 350 tons each, were operated in connection with the cannery vessel *Kasada Maru*.

Fishing operations were chiefly in the vicinity of Amak Island and off the entrance to Port Moller. Crab nets marked with buoys and flags were seen over areas as great as 320 square miles around one cannery vessel. The crab-net area southwest of Amak Island was estimated to be 23 miles long and 2 miles wide. Fishing and canning operations were continuous from about May 15 to August 15.

The training ship *Hakuyo Maru*, of the Imperial Fisheries Institute, again made a trip to Bering Sea for the purpose of instructing students in pelagic-fishery methods and to afford them practice in navigation and seamanship. The vessel was at Dutch Harbor from July 3 to July 7, and on July 8 and 9 the captain and a party visited the fur-seal rookeries at St. Paul Island.

TROUT

A small amount of trout was prepared in Alaska by operators engaged primarily in other branches of the fisheries. The products were as follows: Dolly Vardens, 6,795 pounds fresh, valued at $612; 5,792 pounds frozen, valued at $811; 11,400 pounds canned, valued at $1,103; and 1,500 pounds dried, valued at $30; steelheads, 16,577 pounds fresh, valued at $829; and 25,549 pounds frozen, valued at $1,632. The total output of both species was 67,613 pounds, valued at $5,017, as compared with 40,355 pounds valued at $1,965 in 1933.

MISCELLANEOUS FISHERY PRODUCTS

Several species of fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1934 were as follows: Sablefish, 9,075 pounds fresh, valued at $349; 206,069 pounds frozen, valued at $9,138; and 200 pounds pickled, valued at $12; rockfish, 1,100 pounds fresh, valued at $30; and 3,194 pounds frozen, valued at $112; and flounders, 270,000 pounds fresh, for mink feed, valued at $4,000.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

As usual, the major activity on the Pribilof Islands in 1934 was the taking of sealskins for commercial purposes. A total of 53,468 skins was taken, of which St. Paul Island produced 42,972, and St. George Island 10,496. Eighty-five percent of these skins were shipped to the Fouke Fur Co. at St. Louis, Mo., and 15 percent were delivered to a representative of the Canadian Government at Seattle as the share of Great Britain under the terms of the treaty of July 7, 1911. The Japanese share of 15 percent under the same agreement was included in the shipment to St. Louis to be processed and sold along with the share of the United States, settlement being made in money from the net proceeds of the sales.

A seal patrol was maintained by the United States Coast Guard during the northward migration of the seals from central latitudes to the Pribilof Islands and in Bering Sea during the summer sojourn of the seals in those waters.

The natives of the Pribilof Islands, as wards of the Government, were given the customary medical attention, housing, and sustenance, and schooling for the children.

Increased facilities for the handling of sealskins by enlargement of plants, construction of new roads and reconditioning of old ones, repair of equipment and buildings, and the erection of tanks for the storage of gasoline and oil are listed among the improvements during the year. Additional housing for the natives was also provided.

The Navy Department again rendered valuable service to the Bureau by detailing the U. S. S. *Sirius* for one voyage to transport the annual shipment of supplies to the islands and the season's take of sealskins to Seattle. Perishable foodstuffs and a considerable quantity of general merchandise were shipped from Seattle to the Pribilofs on the several voyages of the *Penguin* between those points.

TRANSPORTATION OF SUPPLIES

The U. S. S. *Sirius*, supply vessel of the Navy, sailed from Seattle on July 24 with 768 tons of general supplies for St. George Island and 1,493 tons for St. Paul Island. Other supplies were landed at St. Paul Island for the naval radio station, at Unalaska for the Coast and

Geodetic Survey, and on the Rat Islands for the Navy Department. The ship reached the Pribilof Islands on August 1. Seven days were required in discharging the cargo and loading the outgoing freight which consisted of 510 barrels of sealskins, 73 barrels of blubber, and 537 empty oil drums from St. Paul Island, and 212 barrels of sealskins and 135 empty drums from St. George Island. The *Sirius* sailed for Seattle on August 8 and reached its destination 11 days later.

Additional supplies for the islands, approximating 1,000 tons, were handled by the *Penguin* on five voyages from Seattle in the year.

POWER VESSEL "PENGUIN"

In 1934 the *Penguin* made five trips from Seattle to the Pribilof Islands and return, transporting passengers and freight to and from the islands and intermediate points, and also performing interisland service. The first voyage began January 4 and was completed on March 22, the next was from April 23 to May 28, and the third from June 10 to August 10. On August 25 the *Penguin* sailed from Seattle on its fourth voyage to the Pribilofs and returned on September 22. The fifth and last voyage began October 6 and ended November 15. During the remainder of the year the vessel was docked at Seattle for a general overhauling.

In May, trips were made to Indian settlements along the Alaska Peninsula and on the Aleutian Islands where native laborers were picked up and transported to St. Paul Island to work during the summer months. At the end of the season these natives were returned to their homes.

Commissioner Bell and his party were transported from Ikatan to the Pribilof Islands on July 11–13 for a short inspection and observation of sealing operations. They left the islands on July 14 and were landed at King Cove on July 16.

Service was rendered to the Navy Department, the Steamboat Inspection Service, and the Post Office Department in the transportation of officials and employees to various points in Alaska. Similar service was extended to a number of unofficial travelers. Passenger lists also included a number of Bureau employees and 20 sealing assistants from St. Louis who were engaged in the cleaning and curing of sealskins at the Pribilof Islands.

The *Penguin* cruised 28,502 nautical miles and consumed 69,409 gallons of fuel oil and 958 gallons of lubricating oil during the year.

ROADS

St. Paul Island.—Material progress in the construction of roads was made in 1934 by extending the Zapadni road 11,560 feet and by adding 2,580 feet to the Northeast Point road between the watch house and the killing field. Good roads to all the rookeries are of prime importance in facilitating the rapid transportation of skins from the various killing fields to the washing and blubbering plant in the village. Eventually all the rookeries will be connected with this plant by scoria-surfaced roads.

St. George Island.—The road to Zapadni was extended 1,800 feet.

BUILDINGS

St. Paul Island.—The three houses for natives for which foundations were laid in 1933 were completed in March. An extension was made to the salt house, a concrete floor was laid in the warehouse, and a platform for gasoline storage tanks was constructed. Boat ways at the west landing were installed and a seal driveway was built at Reef. A watch house was also built at Marunich.

Washhouses A and B were roofed, the coal house was enlarged, and the bunk house for white employees at Northeast Point was rebuilt. This work was accomplished under an allotment of funds by the Public Works Administration.

St. George Island.—Further work on the new schoolhouse which was begun in 1933 resulted in completion of the concrete work and outside walls. Satisfactory progress on the interior of the building was also reported.

NATIVES

CENSUS

On December 31, 1934, the total native population on St. Paul Island was 244, including 10 persons temporarily absent from the island, of whom 4 were on St. George Island, 4 at Seattle, 1 at Unalaska, and 1 at Belkofski. Births numbered 12, deaths 8, permanent departures 6, and permanent additions 4, making a net increase in population of 2.

There were 158 native residents on St. George Island as of December 31, 1934. Four natives of St. George Island became permanent residents of St. Paul Island, and there were 5 births and no deaths during the year.

The total population of both islands at the end of 1934 was 402, an increase of 3 over the total for 1933.

MEDICAL SERVICE

Two physicians were stationed at the Pribilof Islands during the year to render medical aid to the native population and to Government employees and their families.

The native girl who had been placed in the Orthopedic Hospital at Seattle in 1931 for treatment for a tubercular hip returned to St. Paul Island on September 6, 1934. The Bureau of Indian Affairs, which had charge of the child while she was convalescent, delivered her at Unalaska and she was transferred from there to St. Paul Island on the *Penguin*.

SCHOOLS

The Bureau maintains schools for the native children on St. Paul and St. George Islands, two teachers being employed on each island. All children between the ages of 6 and 16 are required to attend.

The 1933–34 school year on each island began September 11, 1933, and closed May 11, 1934. On St. Paul Island 16 boys and 18 girls were enrolled in the junior school and 16 boys and 13 girls in the senior school, a total of 63 pupils. On St. George Island 9 boys and 8 girls were enrolled in the junior and 12 boys and 11 girls in the senior school, a total of 40 pupils.

SAVINGS ACCOUNTS

Twelve Pribilof Islands natives have savings accounts in the bank of the Washington Loan & Trust Co., Washington, D. C., on which they receive interest, compounded semiannually. Effective July 1, 1934, the interest rate was reduced from 3 percent to 2½ percent. The Commissioner of Fisheries is the trustee of their funds. The following statement shows the condition of these accounts for the year:

On hand Jan. 1, 1934	$6, 121. 73
Interest earned from Jan. 1 to Dec. 31, 1934	158. 91
	6, 280. 64
Withdrawn by natives	520. 00
On hand Dec. 31, 1934	5, 760. 64

The following statement shows the amount of money in the individual accounts:

Funds of the Pribilof Islands natives in the custody of the United States Commissioner of Fisheries, as trustee, Dec. 31, 1934

Gromoff, Iuliania	$380. 82	Merculief, Elizabeth	$68. 44
Kochutin, Alexandra	2, 546. 67	Merculief, Erena	632. 69
Kozloff, Marina	127. 86	Merculief, George	104. 30
Kozloff, Raisa	68. 23	Merculief, Tatiana	650. 88
Lestenkof, Michael	404. 71	Pankoff, Agrippina	196. 06
Merculief, Alexandra	88. 31		
Merculief, Daniel	491. 67	Total	5, 760. 64

PAYMENTS FOR TAKING FUR-SEAL SKINS

The natives of the Pribilof Islands are divided into classes according to their ability to perform definite work in the killing and skinning of seals. Six classifications were made, 5 of men and 1 of boys, speed and skill in removing the skins being the determining factor in the personnel of each class. The most experienced and skillful workers were graded as first-class men, while those less experienced and skilled were placed in the lower classes. Boys were employed as apprentices. Advancement through the several grades is governed by the degree of proficiency attained in the specialized work each man is required to perform.

Payments were made at the rate of 50 cents per skin for the total number of skins taken in the season upon the allocation of a definite number of skins per man in each class. In 1934, St. Paul Island produced 42,972 skins and St. George Island 10,496 skins, resulting in a monetary return of $26,734 to the six classes of workmen. Additional compensation amounting to $280 was paid to 4 foremen and 4 mess attendants, making a gross income to the natives of $27,014 on account of sealing operations. The details of these payments are shown in the following table:

Payments to Pribilof Islands natives for taking fur-seal skins, calendar year 1934

Classification	St. Paul Island			St. George Island		
	Number of men	Share of each	Total	Number of men	Share of each	Total
First class	30	$483. 50	$14, 505. 00	27	$153. 00	$4, 131. 00
Second class	11	386. 50	4, 251. 50	3	115. 00	345. 00
Third class	5	267. 00	1, 335. 00	4	90. 00	360. 00
Fourth class	4	193. 50	774. 00	4	67. 00	268. 00
Fifth class	9	53. 00	477. 00	2	32. 00	64. 00
Boys' class	7	20. 50	143. 50	4	20. 00	80. 00
Foreman (additional compensation)			60. 00			55. 00
Do			40. 00			45. 00
Mess attendants (4)			80. 00			
Total	66		21, 666. 00	44		5, 348. 00

PAYMENTS FOR TAKING FOX SKINS

The natives were paid $4 in cash for each fox skin taken on the Pribilof Islands in the 1933–34 season. The total payments amounted to $948 for the 237 skins taken on St. Paul Island and $2,808 for the 702 skins taken on St. George Island, a total of $3,756.

FUR SEALS

KILLINGS

In 1934, 53,468 fur seals were killed, of which 42,972 were taken on St. Paul Island and 10,496 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1934

ST. PAUL ISLAND

Date	Serial no. of drive	Hauling ground	Skins secured
June 12	1	Reef	141
15	2	Sea Lion Rock (Sivutch)	56
18	3	Zapadni and Little Zapadni	79
19	4	Vostochni and Morjovi	256
20	5	Polovina and Little Polovina	28
21	6	Tolstoi and Lukanin	65
22	7	Reef and Gorbatch	757
23	8	Zapadni and Little Zapadni	388
24	9	Polovina and Little Polovina	82
25	10	Vostochni and Morjovi	1, 150
26	11	Tolstoi, Lukanin, and Kitovi	232
27	12	Reef and Gorbatch	2, 117
28	13	Zapadni and Little Zapadni	714
29	14	Polovina and Little Polovina	307
30	15	Vostochni and Morjovi	1, 162
July 1	16	Reef and Gorbatch	1, 468
2	17	Tolstoi, Lukanin, and Kitovi	687
3	18	Zapadni and Little Zapadni	822
5	19	Vostochni and Morjovi	1, 349
6	20	Tolstoi, Lukanin, and Kitovi	988
7	21	Reef and Gorbatch	2, 773
8	22	Zapadni and Little Zapadni	1, 745
9	23	Polovina and Little Polovina	902
10	24	Vostochni and Morjovi	2, 455
11	25	Tolstoi, Lukanin, and Kitovi	353
12	26	Reef and Gorbatch	2, 839
13	27	Zapadni and Little Zapadni	1, 374
14	28	Polovina and Little Polovina	788
15	29	Vostochni and Morjovi	1, 828
16	30	Tolstoi, Lukanin, and Kitovi	755
17	31	Reef and Gorbatch	1, 820

Seal killings on Pribilof Islands in 1934—Continued

ST. PAUL ISLAND—Continued

Date	Serial no. of drive	Hauling ground	Skins secured
18	32	Zapadni and Little Zapadni	599
19	33	Polovina and Little Polovina	658
20	34	Vostochni and Morjovi	1,519
21	35	Tolstoi, Lukanin, and Kitovi	680
22	36	Reef and Gorbatch	1,521
23	37	Zapadni and Little Zapadni	1,110
24	38	Vostochni, Morjovi, and Polovina	1,619
25	39	Reef and Gorbatch	1,191
26	40	Zapadni, Little Zapadni, Tolstoi, Lukanin, and Kitovi	1,148
27	41	Vostochni, Morjovi, Polovina, and Little Polovina	737
28	42	Reef and Gorbatch	901
29	43	Zapadni, Little Zapadni, Tolstoi, Lukanin, and Kitovi	809
		Total	42,972

ST. GEORGE ISLAND

Date	Serial no. of drive	Hauling ground	Skins secured
June 9	1	North	37
16	2	do	30
19	3	East	68
20	4	North and Staraya Artil	155
23	5	East	45
24	6	North and Staraya Artil	375
25	7	Zapadni	52
27	8	East	69
28	9	North and Staraya Artil	620
29	10	Zapadni	50
July 1	11	East	336
2	12	North and Staraya Artil	723
3	13	Zapadni	135
5	14	East	242
6	15	North and Staraya Artil	1,308
7	16	Zapadni	118
9	17	East	122
10	18	North and Staraya Artil	796
11	19	Zapadni	86
13	20	East	297
14	21	North and Staraya Artil	1.015
15	22	Zapadni	147
17	23	East	347
18	24	North and Staraya Artil	498
19	25	Zapadni	84
21	26	East	247
22	27	North and Staraya Artil	1,100
24	28	East	186
25	29	North and Staraya Artil	542
27	30	East and Zapadni	175
28	31	North and Staraya Artil	298
29	32	East	193
		Total	10,496

AGE CLASSES

The age class of a male seal of the Pribilof Islands herd is determined from the length of its body. The classification was derived from measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length (inches)	Age	Length (inches)
Yearlings	Up to 36.75.	4-year-olds	46 to 51.75.
2-year-olds	37 to 40.75.	5-year-olds	52 to 57.75.
3-year-olds	41 to 45.75.	6-year-olds	58 to 63.75.

Ages of seals killed on Pribilof Islands, calendar year 1934

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total
2-year-old males	777	164	941
3-year-old males	41,818	10,117	51,935
4-year-old males	330	202	532
Cows [1]	47	13	60
Total	42,972	10,496	53,468

[1] Cows unavoidably and accidentally killed or found dead.

Some of the seals recorded in the above tabulation as 2-year-olds and 4-year-olds probably were 3-year-olds, as not all male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1934 were confined to 3-year-old males.

RESERVING OPERATIONS

No 3-year-old male seals were marked for the breeding reserve in 1934. It was evident at the close of the season that the number of adolescent males of this age class was ample to maintain in subsequent years the supply of bulls in sufficient strength to meet all breeding requirements of the herd.

COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1934 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,430,418—a numerical increase of 111,850 over the figures for the preceding year. The detailed report will be found on pages 67 to 73 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1923 to 1934, inclusive:

General comparison of computations of the seal herd on the Pribilof Islands, 1923 to 1934

Classes	1923	1924	1925	1926	1927	1928
Harem bulls	3,412	3,516	3,526	4,034	4,643	6,050
Breeding cows	197,659	208,396	226,090	244,114	263,566	284,725
Surplus bulls	1,891	2,043	3,558	2,002	4,827	5,285
Idle bulls	312	390	311	423	972	1,449
6-year-old males	4,863	8,489	4,105	13,434	13,450	12,857
5-year-old males	10,612	5,132	16,792	16,812	16,073	13,001
4-year-old males	5,710	18,670	18,692	17,872	14,448	7,798
3-year-old males	22,786	21,551	21,185	17,189	9,730	11,133
2-year-old males	43,112	45,685	43,515	38,183	41,252	49,087
Yearling males	55,769	59,291	52,091	56,514	61,026	65,861
2-year-old cows	48,801	51,359	49,786	44,415	48,186	57,061
Yearling cows	60,422	64,240	57,309	62,175	67,131	72,481
Pups	197,659	208,396	226,090	244,114	263,566	284,725
Total	653,008	697,158	723,050	761,281	808,870	871,513

General comparison of computations of the seal herd on the Pribilof Islands, 1923 to 1934—Continued

Classes	1929	1930	1931	1932	1933	1934
Harem bulls	7, 187	8, 312	9, 233	10, 088	10, 213	10, 770
Breeding cows	307, 491	332, 084	358, 642	387, 320	418, 299	451, 751
Surplus bulls	5, 207	3, 963	3, 291	2, 893	4, 700	6, 494
Idle bulls	1, 633	1, 899	1, 888	2, 349	2, 341	2, 282
6-year-old males	10, 399	5, 612	6, 553	8, 154	9, 335	8, 173
5-year-old males	7, 016	8, 191	10, 193	11, 669	10, 216	13, 897
4-year-old males	9, 102	11, 327	12, 966	11, 351	15, 441	15, 862
3-year-old males	13, 639	14, 871	13, 198	17, 849	18, 216	24, 770
2-year-old males	64, 354	69, 674	74, 828	81, 101	87, 662	94, 920
Yearling males	85, 381	92, 232	99, 612	107, 592	116, 195	125, 490
2-year-old cows	67, 210	72, 605	78, 410	84, 682	91, 454	98, 768
Yearling cows	85, 417	92, 247	99, 626	107, 593	116, 197	125, 490
Pups	307, 491	332, 084	358, 642	387, 320	418, 299	451, 751
Total	971, 527	1, 045, 101	1, 127, 082	1, 219, 961	1, 318, 568	1, 430, 418

FOXES

Sizable herds of blue foxes are found on both St. Paul and St. George Islands, from which several hundred pelts are obtained each year. The management of these herds is incidental to the sealing industry and requires attention only during the winter, when sealing activities are at a minimum. Beginning about December 1 the foxes are fed specially prepared rations to supplement the natural food supply, which has then become rather scarce. The trapping season also begins early in December, as soon as the skins become prime, and is continued for several weeks.

TRAPPING SEASON OF 1934–35

In the 1934–35 season there were taken 1,002 fox pelts, of which 983 were blue and 19 white. One hundred and eighty-four blue and 16 white pelts were taken on St. Paul Island and 799 blue and 3 white pelts on St. George Island. There were also trapped, marked, and released for breeding stock 11 foxes on St. Paul Island and 266 on St. George Island. The breeding reserve includes likewise a considerable number of animals that were not captured during the season.

REINDEER

St. Paul Island.—During the year ended September 30, 1934, 14 reindeer were killed and used for food. A count of the animals in the herd on October 10 showed a total of 820, of which 147 were the young of the season. The herd was apparently in good condition.

St. George Island.—No reindeer were killed for food during the year ended September 30, 1934. A count made on September 29 showed 72 animals in the herd, of which 8 were the young of the season.

FUR-SEAL SKINS

SHIPMENTS

Seven hundred and twenty-two barrels containing 53,462 fur-seal skins taken on the Pribilof Islands in 1934 were shipped on the U. S. S. *Sirius*, which sailed from the islands on August 8 and reached Seattle, Wash., on August 19. Eight thousand and twenty-two of these skins, packed in 107 barrels, were delivered to a representative of the Canadian Government at Seattle on August 21, in accordance with provisions of the fur-seal treaty; the remainder were forwarded by freight to the Fouke Fur Co. at St. Louis, Mo., and arrived there on August 29.

Six skins taken in 1934, specially treated for experimental purposes, were turned over to an employee of the Fouke Fur Co. at the Pribilof Islands and were brought out by him on the *Penguin*, sailing from St. Paul Island on July 31.

SALES

Two public auctions of fur-seal skins taken on the Pribilof Islands were held at St. Louis in 1934—on April 30 and October 15, respectively—at which a total of 47,101 skins were sold. During the year, also, 3,652 sealskins taken on the Pribilof Islands were disposed of at special sales. In the following detailed statements the sales of other sealskins by the Department of Commerce for the account of the Government are included in order that the records may be complete.

April 30, 1934.—At this sale 28,101 Pribilof Islands fur-seal skins were sold for $575,041.25. Of these, 27,656 dressed, dyed, and machined skins brought $573,935.50, and 445 miscellaneous raw-salted and unhaired and dressed skins brought $1,105.75. In addition, 170 raw-salted fur-seal skins taken by the Japanese Government on Robben Island in 1933 and allotted to the United States as its share of such skins under provisions of the fur-seal treaty were sold for $467.50.

October 15, 1934.—Nineteen thousand Pribilof Islands fur-seal skins, dressed, dyed, and machined, were disposed of at this sale for $336,846.25. These skins consisted of 10,000 dyed black, 3,000 dyed logwood brown, and 6,000 dyed Safari brown. This was the first auction of the new Safari brown, and the average price was higher than that obtained for skins dyed black or logwood brown. There were also sold 3 confiscated sealskins, parchments, for $7.50, making a total of $336,853.75 for fur-seal skins at this sale.

Special sales.—The Department authorized a number of special sales of sealskins in 1934 for advertising and promotional purposes, in accordance with which 3,652 skins were sold for $74,812.05. Of these skins, 1,274 dyed black brought $24,427.08; 1,009 dyed logwood brown, $22,064.41; 1,069 dyed Safari brown, $25,104.56; and 300 raw-salted, $3,216.

Further details in regard to the sales of sealskins by the Department of Commerce for the account of the Government in 1934 are given in the following tables:

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1934

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Percentage
DYED BLACK										
Extra extra large:										
Apr. 30	I and II	15	$35.00	$35.00	$35.00	$525.00	44	$26.18	$1,152.00	0.25
	Scarred, faulty, etc	24	25.50	20.50	23.63	567.00				
	III	5	12.00	12.00	12.00	60.00				
Extra large:										
Apr. 30	I and II	111	35.00	28.00	30.41	3,375.00	245	25.60	6,272.00	1.39
	Scarred, faulty, etc	120	25.50	20.50	22.83	2,739.00				
	III	14	12.00	7.00	11.29	158.00				
Oct. 15	I and II	210	24.00	21.00	22.14	4,650.00	450	19.83	8,925.00	4.50
	Scarred, faulty, etc	240	18.50	17.25	17.81	4,275.00				
Large:										
Apr. 30	I and II	2,004	36.50	25.50	30.12	60,356.00	4,341	24.18	104,977.00	24.64
	Scarred, faulty, etc	2,212	27.50	14.50	19.60	43,366.00				
	III	125	12.00	7.00	10.04	1,255.00				
Oct. 15	I and II	1,730	23.00	20.00	21.10	36,505.00	3,510	18.52	65,005.00	35.10
	Scarred, faulty, etc	1,680	18.00	15.50	16.35	27,475.00				
	III	100	10.25	10.25	10.25	1,025.00				
Medium:										
Apr. 30	I and II	5,179	28.25	18.25	20.98	108,660.50	10,613	17.66	187,395.25	60.24
	Scarred, faulty, etc	5,118	19.00	12.50	14.97	76,610.00				
	III	316	8.00	5.25	6.72	2,124.75				
Oct. 15	I and II	2,620	18.50	15.50	16.35	42,830.00	5,383	14.68	79,029.50	53.83
	Scarred, faulty, etc	2,610	14.00	12.50	13.39	34,955.00				
	III	153	9.00	6.50	8.13	1,244.50				
Small medium:										
Apr. 30	I and II	1,147	17.00	15.50	16.27	18,659.50	2,374	13.82	32,801.75	13.48
	Scarred, faulty, etc	1,136	13.50	9.50	11.94	13,563.00				
	III	91	7.75	6.00	6.37	579.25				
Oct. 15	I and II	340	13.00	12.00	12.37	4,205.00	657	11.56	7,593.00	6.57
	Scarred, faulty, etc	270	11.75	11.00	11.42	3,082.50				
	III	47	6.50	6.50	6.50	305.50				
All classes:										
Apr. 30							17,617	18.88	332,598.00	100.00
Oct. 15							10,000	16.06	160,552.50	100.00

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1934—Continued

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Percentage
DYED LOGWOOD BROWN										
Extra extra large:										
Apr. 30	I and II	8	$34.50	$34.50	$34.50	$276.00	13	$30.85	$401.00	0.13
	Scarred, faulty, etc	5	25.00	25.00	25.00	125.00				
Extra large:										
Apr. 30	I and II	113	36.75	26.50	32.61	3,684.50	247	28.08	6,936.50	2.46
	Scarred, faulty, etc	129	27.50	22.50	24.92	3,214.50				
	III	5	7.50	7.50	7.50	37.50				
Oct. 15	I and II	26	22.50	22.50	22.50	585.00	146	18.39	2,685.00	4.87
	Scarred, faulty, etc	120	19.00	16.00	17.50	2,100.00				
Large:										
Apr. 30	I and II	1,293	36.75	26.50	31.25	40,402.75	2,692	27.32	73,536.25	26.82
	Scarred, faulty, etc	1,348	26.50	22.50	24.30	32,751.00				
	III	51	7.50	7.50	7.50	382.50				
Oct. 15	I and II	274	23.00	20.50	21.16	5,798.75	1,044	17.49	18,258.75	34.80
	Scarred, faulty, etc	770	17.00	15.50	16.18	12,460.00				
Medium:										
Apr. 30	I and II	3,076	33.75	21.50	26.20	80,589.50	5,911	23.82	140,775.50	58.88
	Scarred, faulty, etc	2,740	23.75	20.00	21.70	59,444.50				
	III	95	8.00	7.50	7.81	741.50				
Oct. 15	I and II	571	21.00	17.50	18.77	10,719.00	1,531	16.08	24,619.00	51.03
	Scarred, faulty, etc	960	16.25	13.50	14.48	13,900.00				
Small medium:										
Apr. 30	I and II	697	21.50	18.00	18.50	12,897.25	1,176	16.74	19,688.25	11.71
	Scarred, faulty, etc	444	15.25	14.00	14.66	6,511.00				
	III	35	8.00	8.00	8.00	280.00				
Oct. 15	I and II	99	19.00	13.75	15.29	1,513.50	279	12.20	3,403.50	9.30
	Scarred, faulty, etc	180	11.00	10.00	10.50	1,890.00				
All classes:										
Apr. 30							10,039	24.04	241,337.50	100.00
Oct. 15							3,000	16.32	48,966.25	100.00
DYED SAFARI BROWN										
Extra large:										
Oct. 15	I and II	99	34.00	25.50	31.29	3,098.00	277	25.60	7,092.00	4.62
	Scarred, faulty, etc	178	23.00	21.00	22.44	3,994.00				
Large:										
Oct. 15	I and II	846	34.00	24.50	28.53	24,139.50	2,138	24.39	52,151.75	35.63
	Scarred, faulty, etc	1,292	23.50	20.00	21.68	28,012.25				

Medium:										
Oct. 15	I and II	1,175	25.00	16.00	23.40	27,498.25	3,115	19.77	61,588.25	51.92
	Scarred, faulty, etc.	1,940	19.00	15.00	17.57	34,090.00				
Small medium:										
Oct. 15	I and II	180	21.25	16.00	17.48	3,145.50	470	13.82	6,495.50	7.83
	Scarred, faulty, etc.	290	12.75	10.50	11.55	3,350.00				
All classes:										
Oct. 15							6,000	21.22	127,327.50	100.00
MISCELLANEOUS										
Apr. 30	Unhaired and dressed	202	5.50	1.00	4.36	881.50	445	2.48	1,105.75	100.00
	Raw	243	1.00	.50	.92	224.25				

Special sales of Pribilof Islands fur-seal skins in 1934

Date	Number of skins	Description	Price per skin	Total
Jan. 30	3	Dyed black, small medium	$16.23	$48.69
	6	Dyed logwood brown, medium	22.99	137.94
June 30	49	Dyed black, large	30.12	1,475.88
	205	Dyed black, medium	20.98	4,300.90
	15	Dyed black, small medium	16.27	244.05
	2	Dyed logwood brown, large	31.25	62.50
	26	Dyed Safari brown, large	31.25	812.50
	94	Dyed Safari brown, medium	26.20	2,462.80
Aug. 8	140	Dyed black, large	25.53	3,574.20
	140	Dyed black, large, scarred and faulty	19.20	2,688.00
	300	Dyed black, medium	19.95	5,985.00
	300	Dyed black, medium, scarred and faulty	14.42	4,326.00
	60	Dyed black, small medium	16.23	973.80
	60	Dyed black, small medium, scarred and faulty	12.81	768.60
	220	Dyed logwood brown, large	26.10	5,742.00
	140	Dyed logwood brown, large, scarred and faulty	19.05	2,667.00
	320	Dyed logwood brown, medium	22.99	7,356.80
	200	Dyed logwood brown, medium, scarred and faulty	20.05	4,010.00
	60	Dyed logwood brown, small medium	19.08	1,144.80
	60	Dued logwood brown, small medium, scarred and faulty	15.41	924.60
	2	Dyed black, medium	20.98	41.96
	25	Dyed Safari brown, large	31.25	781.25
	25	Dyed Safari brown, medium	26.20	655.00
Aug. 31	62	Dyed Safari brown, large	31.25	1,937.50
	62	Dyed Safari brown, medium	26.20	1,624.40
Dec. 31	153	Dyed Safari brown, large	28.53	4,365.09
	220	Dyed Safari brown, medium	23.40	5,148.00
	62	Dyed Safari brown, small medium	17.47	1,083.14
	106	Dyed Safari brown, large, scarred and faulty	21.68	2,298.08
	205	Dyed Safari brown, medium, scarred and faulty	17.57	3,601.85
	29	Dyed Safari brown, small medium, scarred and faulty	11.55	334.95
	1	Dyed logwood brown, medium	18.77	18.77
	300	Raw	10.72	3,216.00
	3,652			74,812.05

Sale at St. Louis, Mo., April 30, 1934, of 170 fur-seal skins received from Japanese Government under treaty provisions

Number of skins	Trade classification	Price per skin	Total
170	Raw salted	$2.75	$467.50

DISPOSITION OF FUR-SEAL SKINS TAKEN AT PRIBILOF ISLANDS

On January 1, 1934, there were on hand 73,420 fur-seal skins taken on the Pribilof Islands. Of these, 73,388 were at St. Louis, Mo., and 32 at Washington. The foregoing figures include two skins which were unaccounted for at the close of 1933 but which were subsequently found when the shipment for that year was unpacked at St. Louis.

In 1934 there were taken on the Pribilof Islands 53,468 fur-seal skins, of which 8,022 were allotted to the Government of the Dominion of Canada. The latter represent the Canadian share, or 15 percent, of the season's take, in accordance with treaty provisions, and 2 additional skins to offset a shortage in the previous year's shipment.

Sales of Pribilof Islands sealskins in 1934 totaled 50,753 skins, consisting of 50,553 that were on hand on January 1 and 200 that were taken during the year, leaving 68,113 on hand on December 31, 1934. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government-owned fur-seal skins under the control of the Department of Commerce:

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1934

Source	On hand Jan. 1	Receipts in 1934	Sales in in 1934	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1931	301		301	
Calendar year 1932	26, 718		26, 718	
Calendar year 1933	[1] 46, 369		23, 534	22, 835
Calendar year 1934		45, 446	200	45, 246
United States, share of Japanese fur-seal skins:				
Season of 1933	170		170	
Season of 1934		200		200
Confiscated fur-seal skins		3	3	
Total	73, 558	45, 649	50, 926	68, 281

[1] Includes 2 skins unaccounted for at close of 1933 which were subsequently found when shipment was unpacked at St. Louis.

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1934

Source	On hand Jan. 1			Receipts in 1934	Disposed of in 1934		On hand Dec. 31		
	Fouke Fur Co.	Washington office	Total		Sales	Delivered to Canada	Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:									
Calendar year 1918, held for reference purposes		7	7					7	7
Calendar year 1923		3	3					3	3
Calendar year 1924		1	1					1	1
Calendar year 1929		5	5					5	5
Calendar year 1930		2	2					2	2
Calendar year 1931	301	[1] 14	315		301			14	[1] 14
Calendar year 1932	26, 718		26, 718		26, 718				
Calendar year 1933	[2] 46,369		46, 369		23, 534		22, 835		22, 835
Calendar year 1934				53, 468	200	8, 022	45, 246		45, 246
Miscellaneous skins held for reference purposes		4	4					4	4
United States share of Japanese sealskins:									
Season of 1933	170		170		170				
Season of 1934				200			200		200
Confiscated skins				3	3				
Total	73, 558	36	73, 591	53, 671	50, 926	8, 022	68, 281	36	68, 317

[1] Skins made up into coats for display purposes.

[2] Includes 2 skins unaccounted for at close of 1933 which were subsequently found when shipment was unpacked at St. Louis.

SHIPMENT AND SALE OF FOX SKINS

The 214 blue and 23 white fox skins taken on St. Paul Island and the 700 blue and 2 white fox skins taken on St. George Island in the season of 1933–34 were shipped from the islands on the *Penguin*, sailing on May 17. The vessel reached Seattle on May 28, and the fox skins were forwarded promptly by express to the Department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on April 30, 1934, there were sold 559 blue fox skins that were taken on the Pribilof Islands in the 1932–33 season. These skins brought $19,967.50, an average of $35.72 per skin. The maximum price was $75, obtained for a pelt sold singly.

On October 15, 1934, there were sold at public auction at St. Louis 457 blue and 25 white fox skins taken on the Pribilof Islands in the 1933–34 season. The blue pelts brought $9,345, an average of $20.45 each; and the white pelts brought $333, an average of $13.32 each. The maximum price was $69, obtained for a single blue pelt.

SEA-OTTER SKIN

The skin of a sea-otter pup, said to have been found dead on the beach of Caton Island, Alaska, in June 1934, was surrendered to the Bureau. This skin was sold for Government account at public auction at St. Louis, Mo., on October 15, 1934, for $3.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

Seven Coast Guard cutters and two 125-foot patrol boats were assigned by the Secretary of the Treasury to the patrol for the protection of fur seals of the North Pacific which have their breeding grounds at the Pribilof Islands.

Beginning April 5 the *Redwing* patrolled from the southern boundary of Washington to Dixon Entrance until the fur-seal herd had passed. The *Tallapoosa* covered the waters from Dixon Entrance to Kodiak Island in the last half of April and from Kodiak Island to Unimak Pass during the first half of May. The *Haida* sailed from Seattle on April 16 and the patrol boats *Bonham* and *Ewing* on April 18 for Unalaska, the base for the patrol boats during the remainder of the season and for the *Haida* until July 17, when it was relieved by the *Chelan*. The cutters *Tahoe* and *Shoshone* likewise took turns in the patrol from Unalaska as base, the former having sailed from San Francisco on April 10 and the latter on June 20. The *Northland* left Oakland on May 5 for its usual cruise to the Arctic Ocean and patrolled in Bering Sea and adjacent waters en route. The patrol by Coast Guard vessels extended as far westward as Attu, the westernmost of the Aleutian chain, and was carried on in each locality as long as circumstances required.

BUREAU OF FISHERIES

On April 4 the *Eider* sailed from Seattle for Neah Bay, Wash., to patrol waters in that vicinity during the northward migration of the fur-seal herd. The vessel remained on this patrol duty for about 3 weeks, and after its return to Seattle the work was continued by the *Brant* from April 28 to May 18.

A representative of the Bureau was again stationed at La Push to secure compliance with the regulations prohibiting the use of firearms and motor boats in the taking of fur-seal skins by the Indians there. Very little sealing was done during the season, which was attributed not so much to poor weather conditions as to the low prices for skins. An additional factor was the employment of needy Indians on the C. W. A. road-building project, which proved a more attractive and profitable occupation than the uncertain sealing activities.

SEALING PRIVILEGES ACCORDED ABORIGINES

Under the provisions of the North Pacific Sealing Convention of July 7, 1911, Indians and other aborigines dwelling on the coasts of the waters designated by the convention may take fur-seal skins under limited conditions. In 1934 there were taken and duly authenticated by officials of the respective Governments 290 fur-seal skins, of which 34 were taken by Indians under the jurisdiction of the United States and 256 by Indians of Canada. Reports have also been received of the authentication of 6 additional skins, 3 from male and 3 from female seals, taken in 1933 by Indians of the State of Washington. These, together with the number previously reported, make a total of 98 skins taken in that year by Indians under the jurisdiction of the United States. The details for 1934 are as follows:

Washington.—Twenty-three sealskins taken by Indians of Washington were authenticated. Of these, 6 were from male and 17 from female seals. The skins were taken by Indians of La Push and Neah Bay in the months from February to May, inclusive, and were authenticated by Paul E. Thompson, special agent of the Bureau, and by N. O. Nicholson, superintendent of the Taholah Indian Agency, Hoquiam, Wash.

Alaska.—Eleven sealskins taken by natives of Sitka were authenticated by Warden Donald S. Haley. Of these skins, 3 were from male seals and 8 from females. The seals were taken in the waters off Biorka Island in the months of April and May.

British Columbia.—An official report received by the Bureau stated that 256 fur-seal skins were taken by Indians along the British Columbia coast in 1934.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

The treaty of July 7, 1911, for the protection of fur seals of the North Pacific Ocean provides that the United States shall receive 10 percent of the fur-seal skins taken annually from the Japanese herd. In accordance with that provision 200 sealskins were allotted to the United States as its share of the take on Robben Island in 1934. They were received by the Department's selling agents at St. Louis, Mo., on December 18, 1934.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1934

By Harry J. Christoffers

In order to determine whether sufficient male seals are being reserved for breeding purposes, a census of harem and idle bulls is taken annually at the Pribilof Islands. Using this census as a basis, and estimating the number of cows at the islands by applying the rate of increase ascertained by actual counts of pups through a series of years, the average harem is determined.

The size of the average harem should be suitable to provide for a maximum increase in the growth of the herd. When the average is maintained between 40 and 45 it is safe to assume that sufficient animals have been reserved for breeding purposes. If the average is much less than 40 there is a question whether the number of males reserved may not be larger than necessary. With an average harem of about 40 it seems certain that all females arriving during the rookery breeding period are being properly served.

The virgin females arriving after the rookery breeding period is practically over are for the most part taken care of near the end of the season by the surplus and young bulls that have not held harems or were in the idle bull class. These bulls are strong and virile, while the older bulls which have been holding harems throughout the season are ready to retire before the virgin cows arrive. It is necessary, therefore, that personal observations be made in order to determine whether sufficient surplus bulls have been reserved to take care of the virgin females.

When there is an average harem of less than 40 females, and at the same time a large number of idle and surplus bulls, the breeding bulls do not retain their positions throughout the entire season. The stronger members of the idle and surplus bull class replace the harem bulls as soon as the latter begin to weaken. This does not necessarily mean that the replaced harem bull is not still able to procreate. If still strong and virile, he usually does not retire any farther than the hauling grounds or the rear of the rookery, where he is able to secure transient females.

In 1934, a total of 51,935 animals classed as 3-year-olds were killed, as compared with 52,747 in 1933. This decrease in the total number of 3-year-old males secured was undoubtedly due to the continual stormy weather, accompanied by heavy driving rains, which prevailed throughout the season.

The captain of the *Penguin* reported that large numbers of seals were in Ikatan Bay about July 20, and the captain of a Coast Guard cutter gave a similar report with respect to Akutan Bay. When conditions are favorable at the islands, seals do not usually remain for any considerable time around the Aleutians. The 3-year-old males have no particular reason for going to the Pribilof Islands, as they are not of breeding age. When they do arrive, they like to haul out and sleep and play. Warm foggy weather is favorable for the hauling out of bachelors, while driving rain storms cause them to return to the water.

If weather conditions had been favorable, a shortage of 3-year-old males would have indicated an abnormal death rate at sea. As stormy weather prevailed throughout the entire season, however, it was impossible to determine whether there was an actual shortage of seals. It may be assumed that there was a normal increase in the number of killable seals, but because of adverse weather they did not arrive at the islands.

An annual increase of approximately 8 percent in the past does not necessarily signify that this rate will continue as the herd increases in size. In some years there may be more than the average number of natural enemies of the seals at sea. If the natural enemies increase at the same rate as the herd, the death rate at sea would remain about constant. If the natural enemies increase at a lower rate, then it would soon be possible to have abnormally increased killings in a year or a series of years. It appears that a series of years in which there is a large increase may be followed by a series of years when the growth of the herd is at a standstill, gradually preparing for another period of forging ahead.

BULLS

A census of harem and idle bulls was taken at the usual time. Where large areas or unfavorable conditions made accurate counts impossible, a conservative estimate was made at the time the remainder of the rookery was counted.

Sivutch rookery, on Sea Lion Rock, was not counted. As the small area of Sea Lion Rock is now densely populated with seals during the breeding season, this rookery is hardly capable of continued expansion.

Considerably more bulls of the idle and surplus class were on the rookeries and hauling grounds during the last few days of July than there were about 2 weeks later when the census was taken. This may have been because unfavorable weather in the latter period caused the mature bulls without cows to remain in the water.

A number of bulls branded with a hot iron in 1923, as 3-year-olds, were observed holding harems on various rookeries. These bulls, though 14 years of age, were still active and robust.

Number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1934

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 17	389	86	475	1:5	38.42
Lukanin	do	177	21	198	1:8	40.82
Gorbatch	July 18	793	149	942	1:5	47.85
Ardiguen	do	89	15	104	1:6	40.33
Reef	do	1,493	337	1,830	1:4	51.05
Sivutch (estimated)		400	85	485	1:5	58.30
Lagoon (actual count)	July 17	3	1	4	1:3	37.33
Tolstoi	do	997	214	1,211	1:5	45.00
Zapadni	July 19	866	201	1,067	1:4	49.78
Little Zapadni	do	478	71	549	1:7	45.98
Zapadni Reef	do	62	12	74	1:5	12.29
Polovina	July 20	372	98	470	1:4	41.65
Polovina Cliffs	do	317	55	372	1:6	26.76
Little Polovina	do	103	37	140	1:3	30.00
Morjovi	July 21	309	69	378	1:4	17.97
Vostochni	do	1,993	409	2,402	1:5	31.02
Total		8,841	1,860	10,701	1:5	41.68
St. George Island:						
North	July 23	691	164	855	1:4	43.51
Staraya Artil	do	478	92	570	1:5	47.40
Zapadni	July 22	171	55	226	1:3	18.70
South	do	123	6	129	1:21	6.10
East Reef	do	157	33	190	1:5	43.88
East Cliffs	do	309	72	381	1:4	63.66
Total		1,929	422	2,351	1:5	43.15
Total (both islands)		10,770	2,282	13,052	1:5	41.95

AVERAGE HAREM

The maintaining of a proper average harem is necessary to provide for a maximum increase in growth of the herd. The average harem should be maintained at about 40. A slight variation from this figure would be of no consequence. The average harem for the two islands was 41.95 in 1934, as compared with 40.96 in 1933.

The number of cows, estimated by applying an increase of 8 percent to the number computed for the previous season, and the number of harem bulls, determined by actual count, form the basis for calculating the number of animals in the average harem.

The present average harem should give very satisfactory results. Sufficient harem and idle bulls were present to take care of all females arriving. In addition, there were at the end of the season large numbers of robust mature surplus bulls on the hauling grounds. Besides taking care of virgin females, these mature surplus bulls act as a breeding reserve, for they are at all times prepared to take up harem bull positions, if necessary, and are able to replace harem bulls which have weakened to such an extent that they are unable to hold their cows.

Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1934

Rookery	Breeding cows		Harem bulls, 1934	Average harem		
	1933	1934		1934	1933	Increase (+) or decrease (−) in 1934 from 1933
St. Paul Island:						
Kitovi	13,837	14,944	389	38.42	36.80	+1.62
Lukanin	6,690	7,225	177	40.82	45.20	−4.38
Gorbatch	35,132	37,943	793	47.85	47.22	+.63
Ardiguen	3,323	3,589	89	40.33	42.06	−1.73
Reef	70,568	76,213	1,493	51.05	51.25	−.20
Sivutch	21,594	23,322	400	58.30	53.99	+4.31
Lagoon (actual count pups)	114	112	3	37.33	22.80	+14.53
Tolstoi	41,542	44,865	997	45.00	43.68	+1.32
Zapadni	39,923	43,117	866	49.78	50.34	−.56
Little Zapadni	20,350	21,978	478	45.98	44.92	+1.06
Zapadni Reef	706	762	62	12.29	16.81	−4.52
Polovina	14,347	15,495	372	41.65	43.61	−1.96
Polovina Cliffs	7,856	8,484	317	26.76	28.16	−1.40
Little Polovina	2,861	3,090	103	30.00	23.26	+6.74
Morjovi	5,143	5,554	309	17.97	16.97	+1.00
Vostochni	57,246	61,826	1,993	31.02	29.63	+1.39
Total	341,232	368,519	8,841	41.68	40.94	+.74
St. George Island:						
North	27,841	30,068	691	43.51	40.76	+2.75
Staraya Artil	20,978	22,656	478	47.40	44.92	+2.48
Zapadni	2,960	3,197	171	18.70	18.39	+.31
South	694	750	123	6.10	5.74	+.36
East Reef	6,380	6,890	157	43.88	41.16	+2.72
East Cliffs	18,214	19,671	309	63.66	62.38	+1.28
Total	77,067	83,232	1,929	43.15	41.01	+2.14
Total (both islands)	418,299	451,751	10,770	41.95	40.96	+.99

PUPS AND COWS

The estimated number of pups and cows was determined, as heretofore, by applying an increase of 8 percent to the numbers computed for the previous season.

The percentage of dead pups determined by actual count in 1922 was applied to show the number dead on each rookery. For comparative purposes the dead pups are included in the total number of pups. It is possible that the percentage of dead pups may increase slightly as the rookeries increase in size, especially on flat areas where there are no rocks to afford protection for the young until they are able to find their way to the edge of the breeding area. Inasmuch as the season of 1934 was exceptionally rainy and cold, it is believed that the death rate of pups was considerably larger than usual. For some time after birth the pups appear to suffer severely when it is wet and cold.

For the first time, two stillbirths were noted on Polovina rookery during the same day. Both pups were fully matured and appeared perfect in every way. The mothers exerted every effort to start life by shaking and biting the pups, but failed to do so.

Distribution of pups on the Pribilof Islands, Aug. 10, 1934, and comparison with distribution in 1933

Rookery	1934				1933	1934
	Living pups	Dead pups	Total pups	Percent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	14, 724	220	14, 944	1. 47	13, 837	1, 107
Lukanin	7, 068	157	7, 225	2. 17	6, 690	535
Gorbatch	37, 617	326	37, 943	. 86	35, 132	2, 811
Ardiguen	3, 503	86	3, 589	2. 39	3, 323	266
Reef	75, 100	1, 113	76, 213	1. 46	70, 568	5, 645
Sivutch	22, 753	569	23, 322	2. 44	21, 594	1, 728
Lagoon (actual count)	112	----------	112	----------	114	−2
Tolstoi	44, 241	624	44, 865	1. 39	41, 542	3, 323
Zapadni	42, 375	742	43, 117	1. 72	39. 923	3, 194
Little Zapadni	21, 429	549	21, 978	2. 50	20, 350	1, 628
Zapadni Reef	756	6	762	. 80	706	56
Polovina	15, 258	237	15, 495	1. 53	14, 347	1, 148
Polovina Cliffs	8, 327	157	8, 484	1. 85	7, 856	628
Little Polovina	3, 012	78	3, 090	2. 51	2, 861	229
Morjovi	5, 442	112	5, 554	2. 02	5, 143	411
Vostochni	60, 540	1, 286	61, 826	2. 08	57, 246	4, 580
Total	362, 257	6, 262	368, 519	1. 70	341, 232	27, 287
St. George Island:						
North	29, 647	421	30, 068	1. 40	27, 841	2, 227
Staraya Artil	22, 071	585	22, 656	2. 58	20, 978	1, 678
Zapadni	3, 161	36	3, 197	1. 12	2, 960	237
South	737	13	750	1. 72	694	56
East Reef	6, 786	104	6, 890	1. 51	6, 380	510
East Cliffs	19, 378	293	19, 671	1. 49	18, 214	1, 457
Total	81, 780	1, 452	83, 232	1. 74	77, 067	6, 165
Total (both islands)	444, 037	7, 714	451, 751	1. 71	418, 299	33, 452

MORTALITY OF SEALS AT SEA

Inasmuch as there was no information at hand to indicate that a change was required, the same mortality rates used for computing the number of animals in the herd in 1933 were applied in this year's computation. The fact that there was no increase over the previous year in the number of 3-year-old males arriving during the killing season does not indicate that there has been a change in the average growth of the herd or of any particular class of animals. A decrease might occur for several years and then be followed by a sufficient increase to provide for the estimated average increase as computed from past experience.

COMPLETE COMPUTATION

The following summary shows the methods used for computing the number of animals in the Pribilof Islands fur-seal herd in 1934. The total number of seals of all classes is 1,430,418, or 111,850 more than were in the herd in 1933. This is an increase of 8.48 percent over the preceding year.

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1934

Class	St. Paul Island	St. George Island	Total
Pups, estimated	368,519	83,232	451,751
Breeding cows, 3 years old and over, by inference	368,519	83,232	451,751
Harem bulls, counted	8,841	1,929	10,770
Idle bulls, counted	1,860	422	2,282
Yearlings, male and female, estimated:			
Females born in 1933	170,616	38,534	209,150
Natural mortality, 40 percent	68,246	15,414	83,660
Yearling females, Aug. 10, 1934	102,370	23,120	125,490
Males born in 1933	170,616	38,533	209,149
Natural mortality, 40 percent	68,246	15,413	83,659
Yearling males, Aug. 10, 1934	102,370	23,120	125,490
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1933	94,789	21,408	116,197
Natural mortality, 15 percent	14,218	3,211	17,429
2-year-old females, Aug. 10, 1934	80,571	18,197	98,768
Yearling males, Aug. 10, 1933	94,788	21,407	116,195
Natural mortality, 17.5 percent	16,588	3,746	20,334
2-year-old males beginning 1934	78,200	17,661	95,861
2-year-old males killed in 1934	777	164	941
2-year-old males, Aug. 10, 1934	77,423	17,497	94,920
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1933	71,498	16,164	87,662
Natural mortality, 12.5 percent	8,937	2,020	10,957
3-year-old males beginning 1934	62,561	14,144	76,705
3-year-old males killed in 1934	41,818	10,117	51,935
3-year-old males, Aug. 10, 1934	20,743	4,027	24,770
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1933	14,695	3,521	18,216
Natural mortality, 10 percent	1,470	352	1,822
4-year-old males beginning 1934	13,225	3,169	16,394
4-year-old males killed in 1934	330	202	532
4-year-old males, Aug. 10, 1934	12,895	2,967	15,862
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1933	13,399	2,042	15,441
Natural mortality, 10 percent	1,340	204	1,544
5-year-old males, Aug. 10, 1934	12,059	1,838	13,897
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1933	8,616	1,600	10,216
Natural mortality, 20 percent	1,723	320	2,043
6-year-old males, Aug. 10, 1934	6,893	1,280	8,173

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1934—Continued

Class	St. Paul Island	St. George Island	Total
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1933	7,856	1,479	9,335
Natural mortality, 20 percent	1,571	296	1,867
7-year-old males, Aug. 10, 1934	6,285	1,183	7,468
Surplus bulls, Aug. 10, 1933	([1])	([1])	4,700
Natural mortality, 30 percent			1,410
Remaining surplus for 1934			3,290
Breeding bulls of 1933	10,267	2,287	12,554
Natural mortality, 30 percent	3,080	686	3,766
1933 bulls remaining in 1934	7,187	1,601	8,788
Breeding bulls of 1934	10,701	2,351	13,052
1933 bulls remaining, deducted	7,187	1,601	8,788
Increment of new bulls in 1934	3,514	750	4,264
7-year-old males computed for 1934	6,285	1,183	7,468
Surplus bulls computed for 1934			3,290
Total theoretical bull stock for 1934			10,758
New increment of breeding bulls deducted			4,264
Surplus bulls, Aug. 10, 1934			6,494

[1] Estimates have been worked out, insofar as possible, to show the approximate number of seals of each class which should be credited to each island. Seals do not, however, haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the 2 islands. The total for both islands, however, is approximately correct.

RECAPITULATION

Class	Total	Class	Total
Pups	451,751	5-year-old males	13,897
Cows	451,751	6-year-old males	8,173
Harem bulls	10,770	Surplus bulls	6,494
Idle bulls	2,282		
Yearling females	125,490	Total, 1934	1,430,418
Yearling males	125,490		
2-year-old females	98,768	Total, 1933	1,318,568
2-year-old males	94,920	Numerical increase, 1934	111,850
3-year-old males	24,770	Percent increase, 1934	8.48
4-year-old males	15,862		

FISHERY INDUSTRIES OF THE UNITED STATES, 1934 [1]

By R. H. Fiedler, *Chief, Division of Fishery Industries*

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[1] Appendix II to the Report of the U. S. Commissioner of Fisheries, 1935. Approved for publication May 14, 1935.

FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries as well as an annual review on fishery statistics of the United States. As its name indicates, this division of the Bureau is concerned with the activities and welfare of the commercial fishery and fishery industries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In line with the general policy of economy of the Federal Government during the past year, the division's funds and personnel were greatly curtailed during this period. This made it necessary to curtail our economic and technological work and also made it impossible to conduct statistical surveys of the fisheries in several geographical sections. In the preparation of this report, members of the division's staff have taken part and their assistance is appreciatively acknowledged.

Part I. OPERATIONS OF THE DIVISION

COOPERATION WITH OTHER FEDERAL AGENCIES

As in 1933, various members of the division's staff assisted other Federal agencies in the conduct of technological, economic, and statistical work or studies having a bearing on the fishery industry. Such cooperation was rendered especially to the National Recovery Administration, the Department of Agriculture, the Federal Emergency Relief Administration, the Federal Surplus Relief Corporation, Reconstruction Finance Corporation, and others. The writer continued his detail with the National Recovery Administration, begun in August 1933, until September 30, 1934, as deputy administrator in charge of fishery codes, and on October 1, returned to the Bureau, resuming his regular duties. Since his return to the Bureau, the writer was appointed a member of the Food Survey Committee of the Department of Agriculture. This committee investigates the supply and price situation of surplus agricultural and fishery products to guide the Federal Surplus Relief Corporation in making purchases of surplus food commodities. Considerable assistance was given the Federal Emergency Relief Administration in connection with various relief activities among fishermen.

Also, the Bureau has cooperated with various Federal agencies in obtaining statistical data on our fisheries. The Bureau has the cooperation of the Bureau of Agricultural Economics, Department of Agriculure, in the collection of statistics on the volume of cold-storage holdings of fish, and the health authorities in Washington, D. C., in obtaining the volume of fish handled at the Municipal Fish Wharf and Market in this city. In another instance the Bureau obtains figures on the volume of the quarterly holdings of fish oils for the Bureau of the Census. During the past year, the Bureau aided the National Recovery Administration in obtaining data on methods for sharing the proceeds of a commercial fishing venture.

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[2] Fishery Industries of the United States, 1933. By R. H. Fiedler, John Ruel Manning, and F. F. Johnson, Appendix I to the Report of the U. S. Commissioner of Fisheries for 1934, pp. 1–237.

COOPERATION WITH STATE AGENCIES

In the conduct of its technological investigations, the Bureau has always encouraged and fostered cooperation with the States. By working in close conjunction with the members of the research staffs of various State laboratories and institutions, we have been able to increase the productivity of our relatively small technological staff and have been able to carry out such cooperative investigations at considerably less cost. During the past year, the following cooperative investigations were conducted in the State institutions listed:

A member of our technological staff was stationed in the laboratories of the State Medical College, Charleston, S. C., where members of the staff of the State Medical College have given valuable cooperation in a study of the mineral content of aquatic products. Dr. Roe E. Remington and Dr. Kenneth M. Lynch participated in these investigations.

At Massachusetts State College, Amherst, Mass., laboratory facilities were provided for our bacteriologist to study methods for handling fish. Members of the Massachusetts State College staff cooperating in these investigations were Doctors Fellers, Fuller, and Bradley.

At George Washington University, Washington, D. C., Dr. Leland W. Parr, associate professor of bacteriology in the school of medicine, assisted in the supervision of one of our cooperative investigations on sponge disinfectants.

At Cornell University, Ithaca, N. Y., Doctors H. S. Wilgus, Jr., L. C. Norris, and G. F. Heuser, cooperated in making feeding tests of fish meals experimentally prepared in our technological investigations.

Dr. J. S. Carver of Washington State College, Pullman, Wash., cooperated during the past year in carrying on tests with poultry in the feeding of salmon oils and meals experimentally prepared in our Seattle and Alaska laboratories.

The University of Washington, Seattle, Wash., placed space at the disposal of members of our Seattle technological laboratory for the conduct of certain byproducts investigations.

All of the above cooperative investigations are discussed in detail elsewhere in this report.

In the conduct of its statistical research work, the Bureau also obtains unusual cooperation from various States. The surveys of the fisheries in the various States bordering on the Great Lakes, in the Pacific Coast States, and in Maryland and Virginia, have been greatly facilitated by special cooperation obtained from the State fishery agencies in these States. With this aid, it is now only necessary for the Bureau to conduct partial surveys in these States to supplement the data available from the fishery agencies.

In addition, in nearly every other State where commercial fishing is prosecuted, some type of cooperation on its statistical work is rendered the Bureau by the State fishery or other agencies. This makes it possible for the Bureau to make statistical surveys of a greater portion of our fishery industries than otherwise would be possible.

EXHIBIT AT "A CENTURY OF PROGRESS"

The division continued during 1934 to have supervision of the Bureau's exhibit at "A Century of Progress", the world's fair at Chicago, Ill. The exhibit showed generally the activities of the Bureau in conserving our natural fishery resources and in fostering the fishery industry of the United States and Alaska.

Some of the activities of the Division of Fish Culture were depicted by models of a trout hatchery, fish ladder, and fish lock, and with several aquaria and pools containing some of the common species of food fishes taken in our fresh waters. In addition, a series of glass transparent pictures showed other activities of this division.

The Division of Scientific Inquiry exhibited apparatus used for deep-sea biological investigations, charts of a mackerel investigation being conducted by that Division, and methods of oyster culture. The biology of the Great Lakes fisheries was depicted by pictures and models of nets used in these fisheries.

The Alaska Division had an exhibit of natural and dyed fur-seal skins taken from the Pribiloff Islands.

The Black Bass and Angling Division exhibited fishing tackle appropriate for the taking of bass, trout, salt-water fishes, and surf fishes, thereby depicting the sport fishing angle of our fisheries.

The Division of Fishery Industries exhibited methods for the preservation of nets as recently developed by the Bureau. This was shown by charts, pieces of treated netting, and some of the chemicals used. A century of progress in the utilization of products and byproducts was exhibited by samples of such commodities marketed in 1833 as compared with those on the markets in 1933. Other exhibits of this Division included a display depicting the food value of fishery products, a display of canned and frozen aquatic foods, a model depicting the oyster fishery, and a display of the mussel-shell and pearl-button industry.

MARKETING INVESTIGATIONS

During 1934 an unusual interest was evidenced in the economic and marketing phases of the fishery industry. This industry has suffered to a very great degree during the depression, owing (1) to a curtailment of the movement of fishery products into consumption, and (2) to a somewhat lower price structure for the products that entered the market. This has resulted in a most demoralized situation, and various public and private agencies have attempted to develop plans which might be effective in removing the obstruction to the free flow of fishery products from the fishing port to the consumer. However, those attempting to develop a plan of action were invariably confronted with a lack of economic and marketing data on the fisheries upon which to base a foundation. This was most apparent in developing codes for the industry under the National Industrial Recovery Act, in effectuating relief to the industry through the Federal Emergency

Relief Administration, in extending credit to the industry through the Reconstruction Finance Corporation, in the development of cooperative associations under the act approved by the President on June 25, 1934, and in other ways.

During past years the Bureau conducted some studies on the marketing and distribution of fishery products. However, because of limited funds, these were of somewhat local nature and did not cover the situation in as detailed a manner as present necessity dictates. In view of this, and because fishery economic studies are needed, the writer has encouraged the various States to undertake marketing studies designed to aid the fishery industry within their States. This was urged upon the National Planning Council of Fish and Game Commissioners at the organization meeting of the council in St. Louis, Mo., in April 1934. At this time it was explained that fishermen are in dire need of assistance to market their catch profitably and it was suggested that the State fishery agencies might take a leading part in studying the marketing of fishery products. Some State fishery agencies have taken steps to conduct such studies, and in addition considerable fishery marketing work is being done by several State marketing departments. For instance, the Massachusetts Department of Agriculture has recently conducted schools in various cities of the State to instruct retail fish dealers in the proper care and handling of fresh fish and shellfish.

MARKET SURVEY IN SOUTHEASTERN STATES

With the limited funds at the disposal of the division for fishery marketing work, a study was made during the past year, by W. T. Conn and Herbert E. Munger, on the marketing of fish and shellfish in certain inland cities in the States of Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Tennessee, Kentucky, West Virginia, Ohio, and Indiana. In all, 39 of the larger cities in these States were visited by these men, who interviewed members of the wholesale and retail fish trade, restaurant owners, health officers, and others.

As a result of this study it was found that per capita consumption of aquatic foods west of the Appalachian Mountains in the area visited is about half of that east of the mountains. Great variations in trade practices and domestic demands were found in the several cities, almost every locality having special characteristics. In general, it was revealed that the usual domestic method for cooking fish is by frying, and that housekeepers and domestic help do not want to clean fish. There apparently are two distinct classes of domestic consumers in this area, one demanding quantity and the other demanding quality. A considerable proportion of fish is sold by retailers who have no interest in promoting the industry and who have taken business formerly handled through retail fish markets. Further, it was found that seafood can be retailed at a profit by progressive merchants; motor-truck peddlers have altered former trade practices in many localities; Negroes in the area apparently have double the per capita consumption of whites; there is a general lack of information regarding seafood and its domestic cookery; consumption through public eating places, especially cafeterias, is growing steadily; and that there is need of research to produce improved commercial handling of stocks.

PER CAPITA CONSUMPTION OF FISH

A study made during the year by Fred F. Johnson, in charge of statistical investigations, shows that the domestic per capita consumption of fish and shellfish during 1931 amounted to about 13.3 pounds in terms of the weight as prepared for market. This total figure was comprised of fresh and frozen products, 8.2 pounds; canned, 3.6 pounds; salted, 1 pound; smoked, 0.3 pound; and other products, 0.2 pound. It was interesting to note that only four species or groups of species contributed more than 0.5 pound to the per capita consumption. Of these salmon led with 2.7 pounds and following in order were the group consisting of cod, haddock, hake, pollock, and cusk, 1.5 pounds; sardines, 0.7 pound; and oysters, 0.6 pound. Eight additional species or groups contributed from 0.25 to 0.5 pound These were in order of their importance—sea herring (excluding sardines), mackerel, flounders, halibut, clams, crabs, tuna and tunalike fishes (including Pacific yellowtail), and shrimp.

In 1931 the per capita consumption of meats, according to figures of the Department of Agriculture amounted to 133.2 pounds or about 10 times that of fish and shellfish. The total consumption figure of meats consisted of 69.6 pounds of pork, 49.6 pounds of beef, 7.1 pounds of lamb and mutton, and 6.9 pounds of veal.

STATISTICAL INVESTIGATIONS

Fishery statistics are collected by the Bureau to serve two principal purposes—first, biological; and second, economic. For this reason the Bureau must plan its statistical surveys to obtain comprehensive data for furnishing a complete and reliable picture of the condition and trend of the fisheries. The collection and compilation of the great mass of data necessary, involves many problems. The fisheries are broad in scope including over 160 varieties of aquatic products which enter into commercial production. These, many of which are migratory, are taken by a great variety of types of gear in water areas along our seacoast and in our interior lakes and streams. If the biological aspect is to be served, complete annual statistics are needed on each of these phases in every section. If the economic aspect is to be served statistics are needed on not only the phases listed above relative to the biological aspect but also on the price structure, the processing function, and the marketing and distributing functions.

BIOLOGICAL ASPECT

The biological aspect must consider two problems—the conservation and sustained supply of the resource and the prediction of future trends or yield. Since our fisheries are usually prosecuted in areas not under private ownership, the problem of the conservation of these fisheries is of national concern. It, therefore, is important that close watch be kept of the condition of the various fisheries to detect depletion so that remedial measures can be promulgated timely and wisely. For this reason it is imperative that current statistical data be obtained on the yield of our fisheries.

These statistics then furnish the biologist with the background upon which to base his prediction of future trends and yields. This he does by coupling the statistical data with studies of the life history of the species. Difficulty is experienced in making these predictions because the supply (or population) of the species cannot be seen, as is the case with farm animals or crops. The more complete and more reliable the statistics on yield are, the better foundation the biologist has for conducting his studies. The Bureau, therefore, aims to obtain a complete picture of each individual fishery to further these biological studies.

ECONOMIC ASPECT

With the fishery conserved and trends and yields of the fishery predicted there still remains the problem of supplying the fishery trade with that information so essential to the conduct of its business activities. In these days of increasing competition the very existence of the fishery industry must depend upon reliable economic statistical information. Such material has been especially valuable during the recovery period when it has been required in national planning. The Bureau, therefore, aims to make its statistical survey so complete that the industry and the various governmental organizations may turn to it for reliable fishery statistics.

SURVEYS CONDUCTED

The statistical surveys during 1934 were conducted under the direction of Fred F. Johnson, in charge of statistical investigations. These surveys included the collection and dissemination of statistics of the commercial catch and its value, operating units, and employment in the fisheries. In addition, data were collected on employment and compensation of those engaged in, and products of fishery wholesale and manufacturing establishments.

Unfortunately, continued curtailment of funds and personnel made it necessary to eliminate surveys of the South Atlantic and Gulf States, the Lake States, and the States of the Mississippi River and tributaries; however, summaries of the production in these sections for the most recent years available are included in part 2 of this report.

In addition to the above, statistics were collected on the following special phases: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash. (published monthly); landings of halibut at North Pacific coast ports (published monthly); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of canned fishery products and byproducts of the United States and Alaska; transactions on the sponge exchange at Tarpon Springs, Fla.; volume of fishery products handled at the Municipal Fish Wharf and Market, Washington, D. C.; and the volume of the United States foreign trade in fishery products, furnished by the Bureau of Foreign and Domestic Commerce.

The following statistical and marketing agents assisted in the collection and compilation of the statistical data: H. F. Brown, W. H. Brown, F. F. Dimick, W. H. Dumont, R. L. Greer, V. E. Heffelfinger,

B. E. Lindgren, E. A. Power, W. H. Rich, V. J. Samson, C. B. Tendick, and A. S. Young.

The reader is especially referred to the section in the latter part of this report entitled "Statistical survey procedure" which gives in detail the methods employed in the collection of fishery statistics and other pertinent information.

TECHNOLOGICAL INVESTIGATIONS

Some of the food industries of this country during the past 15 years have made rapid strides in developing new products and new methods of manufacture and in developing a more orderly plan of marketing and merchandising. These developments are no doubt directly traceable to such factors as changes in consumer demand, education of the consumer, shifts in population, occupational changes among our people, and others. Many of these developments have leaned toward the production of prepared and packaged foods of new types, with consequent concentration of trimmings or waste which is available for conversion into valuable byproducts. In turn, methods have been found for converting much of this waste into useful commodities. These developments have clearly demonstrated the need for technical advancement in the aquatic food industry if it is to keep pace with the other food industries. In order to aid in this connection the Bureau is continuously conducting a series of technological investigations covering problems in the manufacture, preservation, and handling of fishery products. A summary of the accomplishments in these fields during the past year appears in the next few pages. For details regarding this work, the reader is referred to published reports and special articles of the various members of the staff, or in case the investigation is not completed, by direct communication with the Bureau of Fisheries in Washington.

LABORATORIES

During 1934 the Division carried on its technological studies under the direction of J. R. Manning, in charge of technological investigations, at its laboratories located in Washington, D. C., Gloucester, Mass., Seattle, Wash., College Park, Md., and at a field laboratory on Kodiak Island, Alaska. In addition, certain cooperative investigations were conducted by our technologists in the chemical laboratory of the State Medical College at Charleston, S. C., the food products laboratory of the Massachusetts State College at Amherst, Mass., the bacteriological and chemical laboratories at George Washington University, Washington, D. C., and the laboratory of the Agricultural Experiment Station, College Park, Md. A résumé of the facilities and equipment at the laboratories in Washington, D. C., Gloucester, Mass., Seattle, Wash., and Charleston, S. C., is contained in the report of this Division for 1933. Late in 1934, under a cooperative arrangement with the University of Maryland, our nutrition laboratory was moved from Washington, D. C., to quarters provided free of charge by the university at College Park, Md. This laboratory is now equipped with all the appliances which were formerly in the nutrition laboratory in Washington, D. C.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

Experimental work during the past year in the preservation of fishery products for food was conducted at the Gloucester laboratory by James M. Lemon, technologist in charge, assisted by Francis P. Griffiths, bacteriologist, and Maurice E. Stansby, chemist, and at the Washington laboratory by Norman D. Jarvis, technologist in charge of canning work. During the latter quarter of the year, Mr. Griffiths was detailed to conduct a series of cooperative bacteriological experiments at the food products laboratory of the Massachusetts State College, Amherst, Mass.

HANDLING FRESH MACKEREL

Mackerel is an extremely delicate fish and is easily bruised and crushed during packing and in shipment. For this reason special care is needed in the handling of this fish so that it will arrive at the market in good condition. One of the methods employed by the industry to overcome this difficulty is "floating," which consists of packing the mackerel in a watertight barrel with sea water and ice. In some cases, the sea water is drawn from the harbor under the packing plant, where it is more or less contaminated. While this method of packing retards bruising and crushing, it leads, in many cases, to decomposition of the mackerel en route to market, with consequent loss to the industry. In order to aid in minimizing these losses, a series of tests were conducted to develop a method for packing and shipping this fish which would have promise of commercial application. As a result of this work, it was found that when fresh mackerel were eviscerated, washed in clean water, and packed in boxes with finely crushed ice, a better product could be placed in the hands of consumers than with the "floating" method.

While this method is superior to the commercial method of "floating", it still is not ideal, as water from the melting ice has a tendency to leach the minerals from the fish.

STORAGE OF FROZEN MACKEREL

When frozen mackerel have been held in cold storage for a certain period, there is a tendency for the oil or fat in the fish to become rancid, thereby making the mackerel unfit for sale. In order to aid in correcting this condition, a series of experiments were conducted on the relationship between temperature of storage and the development of rancidity in mackerel oil, the action of enzymes on mackerel oil, and the seasonal variation in the oil content of mackerel. While these experiments have not progressed to the point where final results can be reported, they reveal that the percentage of oil in mackerel flesh varies from 2 to 5 percent from early spring catches to nearly 30 percent in the August catch, then declines to about 10 percent in the December catch. This study further showed that the development of rancidity is more or less directly correlated with the oil content. This would indicate that mackerel of low oil content, that is, those caught during the early spring, would be less apt to develop rancidity in cold storage. However, economic factors may tend to neutralize some of these benefits, for mackerel commands a relatively high price in the spring, and rental charges for holding the frozen fish in cold storage over a longer period of months, as would be necessary, would be increased.

SMOKED MACKEREL AND STORAGE OF THIS PRODUCT

At periods during the peak of the mackerel season, it often becomes difficult for the trade to dispose of this fish in the fresh condition. This has lead to depressing prices with consequent lowering of the income of mackerel fishermen. It has become increasingly evident that some different method of preservation is needed for mackerel which will present a new "appetite" appeal to consumers for this fish. In view of this, a study was begun, during the past year, at the Gloucester laboratory to develop methods for smoking mackerel and storing smoked mackerel under optimum conditions. While smoked mackerel is not what might be called a new product, as it can be obtained in the market at intervals, no extensive trade has been developed in product owing to the fact that it spoils easily during storage. At this writing, a technique has not yet been developed which has promise of commercial application for overcoming this spoilage. However, tests to date indicate that a practical method can be developed. In this connection, it is interesting to note that smoked mackerel can be used to make delicious and appetizing salads. It, therefore, appears that if a practical method can be developed, a new use can be found for this fish which may be of material aid to the mackerel fishery.

SHRINKAGE OF FRESH FISH PACKED IN ICE

During the past several years, considerable technical study has been given to the effect of ice when used as a preservative on fresh fish. The importance of this work may be seen from the fact that normally about 600,000,000 pounds of iced fresh fish are shipped to market annually. As a rule, the fish in these shipments are packed in direct contact with the ice. Previous study has shown that this method of icing results in dissipating a large proportion of the mineral salts in the fish, with consequent loss in flavor and food value. This loss is caused by general hydrolysis of the complex protein molecules of the flesh induced by the action of enzymes and bacteria. Thus, the soluble protein and mineral salts are drawn from the fish by the water formed from the melting ice. The actual loss in weight is of little consequence, although it may be as high as 10 pounds per ton over a period of 7 days, as further experiments show.

The present investigation was directed toward learning the effect on the weight of fresh fish when packed in ice. As a result, it was found that other than the loss of the mineral salts, and water soluble proteins, as referred to above, there is no appreciable loss in weight, provided the fish are entirely covered with ice. Apparently, there is an exchange of the mineral salts from the fish with water from the melting ice thereby holding the weight of the fish nearly constant. Thus, while this method of preservation results in little or no actual loss in weight, the flavor may be somewhat impaired. The latter may be corrected by packing the round or dressed fish or cuts therefrom in waterproof wrappers before being packed in the ice.

DETERMINATIONS FOR THE RELATIVE FRESHNESS OF FISH

For many years, there has been a need for a standard method for determining the relative freshness of fish or conversely for determining the stages of decomposition in fresh fish. A method has been desired by such governmental authorities as public health inspectors, pure food inspectors, grading inspectors, and the like, as well as many members of the fishery industry. The usual practice has been to determine freshness by an organoleptic test of the product, sometimes accompanied by bacteriological analysis. The former tests oftentimes have resulted in as many verdicts as to the quality as there are judges and the latter requires considerable time as it is necessary to make a culture from the bacteria obtained from the fish. It, therefore, appeared that a need existed for a test that could be used with uniform results by the layman and one which could be performed with a minimum of delay. In order to aid in this direction, a series of technical studies have been conducted by members of the technological staff which resulted in the development of an electrometric method for the detection of the relative freshness of haddock. This method, which was described in brief in last year's report of this division, consists in measuring electrometrically the quantity of a standard acid absorbed by the protein in a given quantity of the flesh of the fish and checking results with a previously developed chart of standardized values.

As the property for absorbing acid by the protein varies slightly in different species, it would be necessary to develop a technique for the various species. In view of this, studies were conducted, during the past year, for determining the relative freshness of cod, pollock, and mackerel. While these have not progressed to the point where a chart can be prepared against which to check the tests, they do indicate that this type of test is applicable to all species of nonoily fish, such as cod and pollock, but that possibly a different technique will need to be developed for such oily fish as mackerel. It appears that the technique for the oily fish will need to include a test for determining the relative rancidity of the oil in such fish.

CANNING AQUATIC FOODS

At the present time, only about 20 of the 160 varieties or species of fish and shellfish taken in our waters are canned (hermetically sealed in tin cans or glass jars) on a commercial scale. This has been due largely to the economic factors of supply and price. However, during late years, there has been a demand on the part of housewives, home economic and relief workers, and others for information on methods for canning aquatic foods. With this in mind, a series of technological and bacteriological investigations have been undertaken during the past several years, to develop methods for canning these products which could be safely and easily used in the home as well as by home economic and relief workers in community kitchens or in commercial establishments. This work has been conducted toward three principal goals. First, toward the selection of species taken in the fishery harvest which would be suitable for canning from the standpoint of availability and adaptability. Second, toward the determination of proper cooking temperatures to create sterility.

And, third, toward packing the product so it will present a pleasing appearance when removed from the can. During the conduct of this work, the following aquatic foods have been experimentally canned: Fish flakes; fish cakes; fish chowder; fish balls; fish pastes; mullet, plain, in tomato sauce, and spiced; mackerel, plain, in tomato sauce, spiced, and smoked; amberfish; salmon, plain and spiced; grouper; squeteagues; croaker; eels, plain and pickled; catfish; carp, plain and spiced; lake trout; whitefish; shrimp; crab meat; clams, whole, minced, and chowder; oysters; alewives; and shad.

In canning the crab meat, particular emphasis has been placed on developing a method for commercial application in canning meat taken from the blue crab caught along the Atlantic coast. Attention also has been given to packing fresh crab meat in various ways in cans for shipment to market under ice.

To date, successful methods have been developed for the home canning of salmon, shad, mackerel, lake trout, whitefish, mullet, and for canning certain types of spiced fish and fish chowder. These methods may be adapted with modifications to the commercial or semicommercial canning of these species. A report on this work has been recently issued by the Bureau and copies are available on request.

As regards the canning methods developed, it has been definitely shown that to obtain sterility in the final product, when canned in the home, it should be packed in no container larger than a no. 2 tin can or pint glass jar, and the product while in the container should be cooked in a steam-pressure retort equipped with a thermometer as well as a pressure gage.

BACTERIOLOGICAL INVESTIGATIONS

In the development of improved processes and methods for the preservation, storage, and other handling of aquatic products, the investigator is constantly confronted with the problems of bacterial spoilage. Therefore, in various of the investigations discussed previously, bacteriological studies are correlated with chemical and engineering studies. For instance, bacteriological examinations were made of the experimental packs of canned aquatic foods to determine which processes produced sterility, on the keeping qualities of fresh mackerel packed in ice, in determining the preservative value of smoke, on the tests developed for determining the relative freshness of fish, and others.

During the latter part of the past year, a special cooperative bacteriological study was begun to determine the effect of antiseptics in ice on the keeping quality of fresh haddock when packed in such ice for temporary preservation. This study is still in progress. In addition, a bacteriological investigation is in progress on disinfecting sponges used in the household. This will be discussed in the following section.

DISINFECTANTS FOR SPONGES

Sponges used in the household for cleansing purposes may be a possible medium for the spread of infectious diseases among the members of the family. In view of this situation, the sponge industry has been meeting with consumer resistance in the purchase of sponges. In order to learn whether this resistance was justified, and if so, what steps might be taken to remedy the situation, the Sponge and Chamois Institute, New York City, requested the Bureau to undertake a study of this problem. This was undertaken as a cooperative investigation with George Washington University, Washington, D. C., where two students from the medical school receiving aid from the Federal Emergency Relief Administration, were detailed to our technological staff. This investigation, which has been conducted in the laboratory of the medical school, has not progressed to the point where definite conclusions can be drawn. However, thus far, it was found that thorough washing of the sponges in hot soapy water sterilizes sponges which had been experimentally infected with certain kinds of bacteria, but such washing has not proven effective in sterilizing the sponges infected with such pathogenic organisms as that causing ringworm. Further studies are being made of the value and possible application of other disinfectants such as phenol.

PRESERVATION OF FISHERY BYPRODUCTS

Because of the increasing demand for information with respect to the utilization of fishery waste materials, technologists of the division have continued an active program of research on the preservation of fishery byproducts. In 1934, investigations were in progress at the Gloucester technological laboratory, the Seattle technological laboratory, a field laboratory in Alaska, and at several State agricultural experiment stations. These studies were carried on under the direction of R. W. Harrison, in charge of our Seattle technological laboratory, with the assistance of A. W. Anderson, technologist of the Seattle laboratory, and S. R. Pottinger, chemist of the Gloucester technological laboratory.

UTILIZATION OF SALMON CANNERY WASTE

Our catch of salmon in the Pacific Coast States and Alaska averages between 500,000,000 and 600,000,000 pounds, annually. Of this amount, at least one-third, or approximately 200,000,000 pounds is waste material, the greater portion of which is discarded and represents a complete loss as well as a sanitary nuisance. Because of the great potential value of this amount of material, the Bureau has continued the studies on the utilization of salmon cannery waste as its major byproducts problem during 1934. The data obtained to date indicate that salmon waste is a potential source of vitamin active oils and highly nutritious fish meals.

Studies concerned with the distribution of the oil in the fish and their vitamin content show that the greater portion of the oil is in the head and flesh portions, that vitamin D is quite uniformly distributed in all the waste fat, although the visceral fats are richest in this vitamin, and that vitamin A is confined almost entirely to the visceral oils.

Oils from the total waste of the various species of salmon are quite uniform in vitamin D, but vary considerably in vitamin A. Chinook oil has the highest vitamin A potency, but contains less vitamin D than the other salmon oils. Sockeye and silver salmon are good sources of both vitamins A and D; and pink and dog salmon are good sources of vitamin D, but relatively poor sources of vitamin A. All salmon oils, therefore, are highly desirable for poultry nutrition, while oil from chinook, sockeye, and silver salmon, if prepared properly, will compare favorably with U. S. P. requirements for medicinal cod-liver oil.

Studies with regard to methods for manufacturing the fish oils indicate that the common practice of cooking is not necessarily destructive to the vitamins extracted by the fats. Rather the vitamin potency of the oils seems to depend upon the freshness of the raw material, the extent to which the visceral parts are utilized in making the oil, and the efficient mechanical extraction of the press liquors.

As a corollary to these studies, our technologists gave assistance to the industry in the development of edible salmon oils for use in canning and conducted tests on the effect of adding high-grade salmon oil to salmon during the canning process. Preliminary results indicate that the addition of this oil is effective in improving quality.

Studies with respect to effect of manufacture on salmon meals were started, but sufficient data are not available for making a preliminary report.

EFFECT OF MANUFACTURE ON THE QUALITY OF NONOILY FISH MEALS

Studies concerned with the effect of manufacture on the composition and nutritive properties of nonoily fish meals, which have been in progress several years, were completed in 1933 and during the past year the data have been assembled for use in reports. These studies have shown:

(1) Fish meal proteins, as shown by tests for feeding efficiency, biological value, digestibility, and destruction of essential amino acids, are not affected as much by conditions of drying as is vitamin G.

(2) Vitamin G is water soluble and is removed with the water soluble protein by the wet process.

(3) The water soluble proteins removed by the wet process are not of as high quality as the residual flesh proteins.

(4) The head portion of the waste is the richest source of vitamin G, while the backbone and flesh portion has the highest quality protein.

(5) Flame drying is definitely destructive to vitamin G and decreases the value of the protein.

From these data it is possible to draw certain practical conclusions, some of which are:

(1) Dry process meals have greater general nutritional value than wet process meals, owing to the advantage given by vitamin G, in the former, overbalancing the slightly higher quality proteins of the latter.

(2) Steam dried meals are superior to flame dried meals.

(3) Steam drying under vacuum improves the value of a meal slightly over steam drying at higher temperature. This is due more to effect on vitamin G than on the protein.

(4) Wet process oily fish meals cannot be expected to be important sources of vitamin G.

(5) From the standpoint of quality, there would be no particular advantage in drying wet process meals under vacuum if normal steam drying at atmospheric pressure can be accomplished.

STUDIES OF THE DRYING OF NONOILY FISH WASTE

The studies on effect of manufacture on the quality of nonoily fish meals demonstrated the need for more information on a satisfactory dry rendering process. The experimental data obtained as a result of studies in this connection have shown that dry reduction can be accomplished without detrimental "sticking" and "caking" of the gluelike material in the dryer, if steam pressure and vacuum are maintained at proper levels as drying progresses. From a strictly production standpoint, the greater yield of meal by the dry process counterbalances the less difficult and apparently lower operating costs of the wet process. When nutritive quality of final products are considered, the dry process has an additional advantage over the wet process.

UTILIZATION OF SWORDFISH LIVERS

The work on swordfish-liver oil which was begun in 1933, to develop a method for the commercial manufacture of this product and thereby make use of a product not fully utilized, was continued during the past year. On the basis of the data obtained the following conclusions may be drawn:

Swordfish livers vary in fat content between 15 and 20 percent during the course of the fishing season. The livers do not give up oil readily either by steaming or boiling in water. To obtain efficient oil removal either solvent or improved mechanical extraction methods must be used.

Depending on the method of extraction, swordfish-liver oil will vary in color from amber to dark brown and from a liquid at room temperature to a solid fat.

The manner of fat and vitamin storage in swordfish livers is such that the mere extraction of oil does not give efficient vitamin extraction unless conditions are such that the oil comes in intimate contact with the liver tissue. This brings out the role of fat as a vitamin solvent during liver extraction and suggests the possibility of using fish and other oils commercially in extracting vitamins from low fat content livers.

Solvent-extracted swordfish-liver oils were prepared during the course of the investigation which were 100 times more potent than the U. S. P. standard of reference cod-liver oil, which contains 3,000 U. S. P. vitamin A units per gram and 95 U. S. P. vitamin D units per gram. These samples indicate that swordfish-liver oil is the richest known natural concentrate of both vitamins A and D.

A preliminary report on this investigation has been prepared and as a result of these studies, swordfish livers are now being used in liver-oil manufacture and fishermen are obtaining a new source of revenue from materials formerly discarded.

HADDOCK-LIVER OIL

The general results of the Bureau's haddock-liver oil investigation were given in the 1933 report. During the past year these data have been assembled in a form suitable for publication. In last year's report, is was stated that haddock-liver oil corresponded favorably with U. S. P. specifications for cod-liver oil in every respect except iodine number. The variation with respect to iodine number is not important when unchilled oils are considered. However, during the past year, a new U. S. P. specification has appeared, in which U. S. P. cod-liver oil is designated as a partially destearinized oil. Partially destearinized haddock-liver oils will exceed U. S. P. iodine number specifications in many cases. Therefore, since it is quite generally agreed that haddock-liver oil was meant for inclusion with cod-liver oil and similar liver oils in the class of U. S. P. cod-liver oil, publication of these data should serve as a guide in changing specifications to cover adequately the materials that are supposed to be included under the classification.

NUTRITIVE VALUE OF AQUATIC PRODUCTS

Because we are concerned primarily with food products, our nutrition studies are a very necessary and important phase of our technological work. Not only is it essential to determine the food value of fish and shellfish products and byproducts now on the market, but the relative nutritive value of any experimentally prepared food product is the only true yardstick or standard of measurement for evaluating improvements in methods of manufacture, preservation, handling, and storage of such products.

During the past year, various phases of the nutrition investigations were carried on, respectively, in the nutrition laboratory in Washington, D. C., which in the early fall was moved to College Park, Md., and in the chemical laboratory of the State Medical College at Charleston, S. C., by Charles F. Lee and E. J. Coulson, of the technological staff.

SWORDFISH-LIVER OIL

In order to evaluate the adequacy of experimental methods for producing oils from swordfish livers, as described previously in this report, such oils as manufactured in the laboratory by various methods were tested for their vitamin potency.

Livers from last season's (1934) catch of swordfish were extracted with a number of different organic solvents, such as petroleum ether, ethyl ether, ethylene dichloride, carbon tetrachloride, ethyl acetate, acetone, and toluene. Extractions were made of both cooked and uncooked livers. Results thus far indicate that ethylene dichloride, petroleum ether, and ethyl ether, seem to yield the oil with the highest vitamin potency from both.

Including samples produced both in 1933 and 1934, the variation in vitamin A potency ranges from 36,000 to 300,000 international vitamin A units per gram. These samples vary in vitamin D potency from 2,850 to 9,500 international vitamin D units per gram. Expressing it another way, swordfish-liver oil runs as high as 100 times the U. S. P. standard reference cod-liver oil in vitamins A and D.

SALMON OIL

Vitamin tests of oils prepared from the trimmings remaining from salmon canning operations, from salmon eggs, and from salmon livers, were continued during 1934. The oil samples used in these tests were prepared according to various experimental methods of manufacture by technologists in our Seattle and Alaska laboratories. In general, oils prepared from salmon livers are approximately 5 to 20 times as potent in vitamin A and approximately 2 to 3 times as potent in vitamin D as an average medicinal cod-liver oil. The oils prepared from salmon eggs and from trimmings compare favorably in vitamin potency with an average medicinal cod-liver oil. The results obtained in 1934 averaged about the same vitamin potency as the samples prepared experimentally in 1933 insofar as their vitamin D content was concerned, although some of them were somewhat low in vitamin A potency.

A more detailed discussion of the variation in potencies of salmon oils appears in a previous section of this report under the heading of "Utilization of salmon cannery waste."

HORSE MACKEREL-LIVER OIL

During the past year, a sample of oil extracted by ethylene dichloride from the liver of the horse mackerel or Atlantic tuna was tested for vitamins A and D. As a result, it was found that this oil contained 7,100 international vitamin D units and 60,000 international vitamin A units.

CRAB MEAT

Samples of fresh crab meat as prepared commercially from the blue crab of Chesapeake Bay were tested for vitamins A and G. In the vitamin A tests, the crab meat was found to contain 40 to 55 U. S. P. vitamin A units per ounce of crab meat. In the vitamin G tests, the crab meat was found to contain about one-half a unit of vitamin G per gram of crab meat. The so-called "curative technique" was used for the vitamin A assay, while the "Sherman" method was used for the vitamin G assay.

SODIUM ALGINATE

Because, in recent years, sodium alginate, a product made from the Pacific coast kelp, has found widespread use in dairy products as a stabilizer, the Bureau was requested by the industry to determine its food value. Accordingly, tests were made of this product with laboratory animals. Fed at the level of 3 percent of the ration, sodium alginate showed definite food value. Our tests indicated that this product possesses the same general properties in stimilating growth and appetite in the experimental animals (white rats) as was found in the kelp-meal tests conducted by our technologists, a few years ago (Technological Report No. 5).

CONCH MEAT

Considerable quantities of conchs are found along the coast of Florida and in certain of our possessions in the West Indies. The meat of this animal is highly prized for food in different localities and in recent years an effort has been made to widen distribution. This has been done by developing a canning industry in Florida which produces such products from conch meat as cocktails, juices, concentrates, etc. Since no analyses of conch meat were available, a study was made of the chemical composition of this product. This revealed that conch meat, on a fresh basis, contained the following: moisture, 74.6 percent; protein, 18.6 percent; fat, 0.3 percent; and ash, 1.7 percent. Also it was found that conch meat contains 290 parts of iodine per billion.

MINERAL CONSTITUENTS OF FISHERY PRODUCTS AND BYPRODUCTS

Much has been written in the scientific literature in recent years concerning the increasing importance of minerals in nutrition. Probably no other class of foods offers so attractive a field of study, in this respect as fishery products, since it is commonly known that these products contain minerals in quantity and variety, many of which have been shown by scientific investigators to be of great importance in both human and animal nutrition. During recent years the Bureau has carried on an extensive study of the nutritive value of minerals in fishery products. Toward this end, chemical analyses of the quantity of these minerals in various fishery products of commercial importance are being made. Following this, these fishery products are fed to laboratory animals to determine the biological value of such minerals.

The biochemical investigations during the past year have been of two types; first, a study of those mineral elements contained in sea foods which are considered to be of great importance in both human and animal nutrition; and second, investigations of the characteristics of those elements, also contained in sea foods, which are usually considered to be deleterious to health. Investigations of the iodine content of various fishery products of commercial importance by a more recent method has revealed that the iodine content of some of them is actually many times higher than has previously been reported in this country. For instance, the following average results are reported of the iodine content, in parts per billion, of some of the important species of fish, on a fresh basis: haddock, 5,130; cod, 1,030; and mullet, 4,850.

The problem of the removal of arsenical spray residues from fruits and vegetables in order to make those foods safe for human consumption has recently focused the attention of investigators on the naturally high arsenic content of sea foods. Because of increasing concern which is being shown by scientific workers at the present time, an investigation was undertaken to study the characteristics of organic arsenic as it is contained in marine products when fed to laboratory animals.

The results of these investigations have revealed that there is a difference in the metabolism of organic arsenic as it occurs in shrimp as compared to inorganic arsenic and that while the inorganic arsenic is absorbed and stored in the body, the organic arsenic from shrimp is eliminated. Careful histological studies of the organs of the experimental animals have failed to reveal any deleterious effects of this element when fed in the form of shrimp. Like studies on the effect of feeding organic copper in the form of "coppery green" oysters have yielded similar results.

Considering the results of the above-described work on arsenic and copper, as well as the findings of other investigators that only a part of the iron and copper of some foods is available for hemoglobin production, it is becoming apparent that not only must the presence of an element in a food be proven, but its availability to the body must be tested by animal experimentation methods. Consequently, it can no longer be assumed that the chemical analysis of a food, with regard to its mineral content, is an accurate measure of its value as a source of those minerals in the diet.

FISH COOKERY INVESTIGATIONS

As is related elsewhere in this report, the per capita consumption of aquatic foods in this country is very low compared with many other countries, being only about 13.3 pounds annually. This, of course, has a direct effect on the industry in that capacity production cannot be attained by fishermen and processors and also an effect on our people in that they are depriving themselves of a wholesome nutritious food of valuable healthful properties. Believing that consumption is retarded because of the lack of informative methods for cooking fish and shellfish for the table, the Bureau installed a fish cookery kitchen in its laboratory in the Department of Commerce Building in Washington. Here a series of simple recipes for cooking aquatic foods in the home were tested by Miss Agnes I. Webster and W. T. Conn.

During the course of this work, many kinds of fish and shellfish were cooked by frying, broiling, baking, boiling or steaming, and planking. Also recipes were tested for making fish chowders, and flaked fish, for cooking fish with vegetables, for cooking salted and smoked fish, and for cooking oysters, shrimp, crabs, clams, lobsters, and scallops. In addition, recipes were tested for making sauces to be used with fish and shellfish.

As a result of these tests, a cookbook has been prepared giving simple recipes for cooking aquatic foods which can be followed with ease in the home by the housewife.

RESEARCH ASSOCIATES AND STUDENT ASSISTANTS

In the above lines of industrial research the Bureau has attacked those fundamental problems which promise to be of greatest value to the largest number and which are possible with the funds and personnel available for the purpose. For this reason, the division has not been able to study special problems affecting certain products, processes, or methods. In order to serve the industry in this connection, the Bureau by congressional authorization has provided research associate facilities whereby firms or groups having special industrial problems to solve will furnish the investigator and pay his salary and expenses. The investigation is carried out in cooperation with the Bureau's staff in its laboratories and under its control. Thus the industry can be provided with laboratory, consultation, and library facilities which in many instances it is unable to obtain elsewhere.

In addition to the above, the Bureau has opened its technological laboratories to research students pursuing courses in several universities. In this manner the student is able to apply in a practical manner the theoretical knowledge obtained at the university. These men are usually assigned to aid our investigators in the conduct of investigations already initiated by the Bureau. For instance, during the past year, Donald A. Bean and Richard M. Locke, students at Northeastern University in Boston, spent alternately 5 weeks in the university pursuing the regular-school curriculum and 5 weeks in our technological laboratory at Gloucester, Mass., aiding in the conduct of research problems pertaining to fish preservation and spoilage.

James W. McCurley, W. B. Matthews, John W. Webster, Roscoe Dwiggins, Arthur Kahn, and F. L. Clavelaus, jr. (deceased), students at the University of Maryland receiving aid from the Federal Emergency Relief Administration, worked in our nutrition laboratory at College Park, assisting in the conduct of studies on the vitamin content of fish oils. These men, during the school year, spent several hours per day in the laboratory.

At George Washington University, Washington, D. C., William H. Conway and William J. P. Howard, medical school students receiving aid from the Federal Emergency Relief Administration, were detailed to a study of the development of disinfectants for sponges in household use. This project was under the joint supervision of the Bureau and the university, and the details of the investigation are described elsewhere in this report.

EDUCATIONAL AND CONSULTING SERVICES

In addition to the activities described in this report, our economic and technological staff conducts an educational and consulting service for those interested in the fisheries. Some of these functions and services have been discussed or referred to in previous paragraphs of the report. In addition, various members of the staff have conducted lectures and practical demonstrations relative to the fisheries and the fishery industries at various State educational institutions and at public gatherings of various sorts. Further, members of the staff have delivered radio addresses on various fishery subjects. The Bureau or the division also answered many thousands of letters on fishery subjects and has supplied information to persons who have called at the Bureau, personally. Many of the latter have come from foreign lands to seek information on the conduct of the fishery industries in the United States, which might be useful in the more orderly conduct of the fisheries of their native lands.

PUBLICATIONS OF THE DIVISION

During the calendar year 1934 the following publications were prepared and addresses delivered by members of the division's staff. These do not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The fishery reports and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D. C. The statistical bulletins and special or S-memoranda are distributed free of charge upon request to the Bureau. The special articles may be obtained from the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the Bureau should request that their names be placed on the Bureau's mailing lists nos. 128 for the annual statistical report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery industries of the United States, 1930" by R. H. Fiedler, Appendix II to the Report of the United States Commissioner of Fisheries for the fiscal year 1931.

DOCUMENTS, REPORTS, AND CIRCULARS

COULSON, E. J.

The iodine content of oysters. 8°, 10 pp., 1 fig. Investigational Report No. 18. 5 cents.

COULSON, E. J., ROE E. REMINGTON, and KENNETH M. LYNCH.

Studies on the metabolism of copper. 8°, 12 pp., 2 figs. Investigational Report No. 23. 5 cents.

FIEDLER, R. H., JOHN RUEL MANNING, and F. F. JOHNSON.

Fishery industries of the United States, 1933. 8°, 237 pp. Appendix I Report of Commissioner, 1934. 20 cents.

GRIFFITHS, FRANCIS P., and J. M. LEMON.

Studies on the smoking of haddock. 8°, 12 pp., 1 fig. Investigational Report No. 20. 5 cents.

JOHNSON, F. F.

Aquatic shell industries. 8°, 17 pp., 5 figs. Fishery Circular No. 15. 5 cents.

JOHNSON, FRED F., and MILTON J. LINDNER.

Shrimp industry of the South Atlantic and Gulf States, with notes on other domestic and foreign areas. 8°, 83 pp., 31 figs. Investigational Report No. 21. 10 cents.

SPECIAL ARTICLES AND ADDRESSES

CONN, W. T.

Net preservative research, 1933, with recommendations. Bureau of Fisheries' Memorandum S-335, February 9, 1934. Published in Fishing Magazine, February 1934, New York City.

Retailing fish. Bureau of Fisheries' Special Memorandum 2450-G, December 19, 1934. Published in The Fisherman, February–March 1935, Grand Haven, Mich.

A tip to coast fishermen on nets. Alabama Game and Fish News, August 1934, Montgomery, Ala.

Save nets—save dollars. The Florida Conservator, December 1934, Tallahassee, Fla.

More life from fish nets. (Bureau of Fisheries' Special Memorandum 1651-H, December 1933.) Reproduced (without trade lists) in Fish and Oyster Reporter, February 1934. Tampa, Fla.; Atlantic Fisherman, January 1934, Goffstown; Fishing Magazine, February 1934, New York City: abstracted in Pacific Fisherman, February 1934, Seattle, Wash.; and recommended in the Fishing Gazette, January 1934, New York City.

Atmospheric exposure of linen and cotton with special reference to fish nets. (Bureau of Fisheries' Special Memorandum 1651-G, published November 1933.) Reproduced in substance in The Fisherman, November 1934, Grand Haven, Mich.

COULSON, E. J.

The oyster as a source of minerals. Fishing Magazine, May 1934, New York City.

Oysters in anemia. Address before the joint convention of the National Shellfisheries Association and the Oyster Growers and Dealers Association of North America, Inc., Baltimore, Md., August 7, 1934.

Chemical composition of conch meat. Bureau of Fisheries' Special Memorandum 2065-B.

COULSON, E. J., ROE E. REMINGTON, and KENNETH M. LYNCH.

Studies on the toxicity of copper. Address before the Biological Chemistry Section, American Chemical Society, St. Petersburg, Fla., March 27, 1934. Published as Fisheries' Investigational Report No. 23.

Toxicity of naturally occurring arsenic in foods. Science. September 7, 1934, New York City. Bureau of Fisheries' Special Memorandum 2524.

FIEDLER, R. H.

Purpose of the oyster code. Address before the joint convention of the National Shellfisheries Association and the Oyster Growers and Dealers Association of North America, Inc., Baltimore, Md., August 6, 1934.

Relationship between the sportsmen anglers and the commercial fishermen. Radio address delivered over Station WMAL, November 30, 1934. Washington.

Codifying our fisheries under the Recovery Act. Address before the National Planning Council of Fish and Game Commissioners, St. Louis, Mo., April 23, 1934.

Griffiths, Francis P., and Maurice E. Stansby.
The significance of bacterial count and chemical tests in determining the relative freshness of haddock. Address before the Montreal meeting of the American Fisheries Society, September 13, 1934.

Harrison, Roger W.
Recent developments in fisheries technology. Address before Fisheries Section, Pacific Northwest Regional Planning Council, Seattle, Wash., December 13, 1934.

Jarvis, Norman D.
Cold smoked Florida fish. Florida Conservator, vol. 1, no. 5, pp. 11–12, November 1, 1934. Tallahassee, Fla.

Lee, Charles F., and Chester D. Tolle.
Salmon liver and salmon egg oils, vitamin content, and chemical and physical properties. Industrial and Engineering Chemistry, vol. 26, p. 446, April 1934. Bureau of Fisheries' Special Memorandum 1738–23.

Manning, J. R.
Relation of the fishery industries as a source of raw material in the manufacture of dog foods and related products for animal feeding and general information on the need for standards and marketing grades in this industry. (Special report prepared for the National Recovery Administration and delivered at the public hearing on the Code of Fair Competition for the Dog Food Industry on Feb. 16, 1934.) Bureau of Fisheries' Special Memorandum 2450–I.

Interchangeability of uses of oils and fats. (Copied from p. 5925 of Cong. Rec., 73d Cong., 2d sess., vol. 78, no. 70, Mar. 29, 1934, Washington). Bureau of Fisheries' Special Memorandum 1417–B.

Technological investigation in the Great Lakes fisheries. Published in The Fisherman, vol. 3, no. 3, May–June 1934. Grand Haven, Mich.

Sumario del valor de los productos de la pesca en la nutricion humana y animal. Published in Boletin de la Oficina Sanitaria Panamericana, Ano 13: no. 6, Junio de 1934.

Fish and shellfish for food. Bureau of Fisheries' Special Memorandum 2256–B.

Domestic fish oils now available as sources of vitamins for human nutrition. Prepared for and issued by the Division of Cooperative Extension, United States Department of Agriculture, December 6, 1934.

Remington, Roe E., E. J. Coulson, and H. von Kolnitz.
Application of enclosed torch to estimation of arsenic in foods. Industrial and Engineering Chemistry, Analytical Edition, July 15, 1934. Easton, Pa.

STATISTICAL BULLETINS

Fisheries of the New England States, 1932. Statistical Bulletin No. 1074.

Fisheries of the Middle Atlantic States, 1932. Statistical Bulletin No. 1061.

Fisheries of the Chesapeake Bay States, 1932. Statistical Bulletin No. 1062.

Fisheries of the South Atlantic and Gulf States, 1932. Statistical Bulletin No. 1073.

Fisheries of the Pacific Coast States, 1932. Statistical Bulletin No. 1068.

Lake fisheries, 1932. Statistical Bulletin No. 1069.

Fisheries of the United States and Alaska, 1932. Statistical Bulletin No. 1075.

Fishery products frozen and cold storage holdings of frozen and cured fishery products in the United States and Alaska, 1933. Statistical Bulletin No. 1067.

Production of fresh and frozen packaged fish in the United States, 1933. Statistical Bulletin No. 1080.

Canned fishery products and byproducts of the United States and Alaska, 1933. Statistical Bulletin No. 1086.

Fisheries of Alaska, 1933. Statistical Bulletin No. 1085.

Landings by fishing vessels at principal New England ports, 1933—by months. Statistical Bulletin No. 1065.

Landings by fishing vessels at principal New England ports, 1933—by gear and fishing grounds. Statistical Bulletin No. 1079.

Fishery products landed by United States fishing vessels at Seattle, Wash., 1933. Statistical Bulletin No. 1081.

Part 2. FISHERY STATISTICS, 1933

GENERAL REVIEW

Available data for 1933 indicate an appreciable increase in both the volume and the value of the catch of fishery products in the United States and Alaska as compared with the preceding year. Statistics of the catch in the New England, Middle Atlantic, Chesapeake, and Pacific States, and Alaska were collected for 1933, and when considering the combined catch of these sections alone an increase of 13 percent in the volume and also 13 percent in the value of the catch in 1933 is indicated as compared with the same sections the previous year. This increase was accounted for principally in the Pacific Coast States and was reflected especially in increased catches of salmon, pilchard, and mackerel. The value of the production of canned fishery products in all sections increased 37 percent as compared with 1932; byproducts increased 40 percent; and frozen fish, 14 percent. The value of the production of packaged fish also increased.

The total catch of fishery products in the United States and Alaska as based on the most recent surveys, amounted to 2,899,048,000 pounds, valued at $60,218,000. About 117,000 fishermen were employed in making this catch.

In 1933 in the United States and Alaska, the production of canned fishery products amounted to 533,212,154 pounds, valued at $59,799,963; the output of byproducts was valued at $17,465,986; and the production of frozen fishery products amounted to 95,873,507 pounds, estimated to be valued at $8,000,000. Based on the most recent surveys the production of cured fishery products amounted to 104,310,213 pounds, valued at $12,823,491, and fresh and frozen packaged fish and shellfish, 129,608,348 pounds, valued at $17,294,092. It is estimated that about 500,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $40,000,000, were marketed during 1933. The total marketed value to domestic primary handlers of all fishery products in 1933 is estimated at about $155,000,000.

Fishery products imported for consumption were valued at $30,462,341 and domestic exports were valued at $8,338.723.

New England States.—The catch in these States for 1933 showed an increase in volume as compared with the previous year but a decrease in value. The value was less than in any year for which there are records since 1902. There were increases in both the volume and value of the combined landings of fishery products by vessels at Boston and Gloucester, Mass., and Portland, Maine, and there was a large increase in production of Maine sardines. The quantity of fish frozen was practically the same as in 1932.

Middle Atlantic States.—The catch statistics for the Middle Atlantic States in 1933 showed an increase in both volume and value as compared with the previous year; however, with the exception of 1932 the value was less than in any year for which there are records. There was an increase in the production of frozen fish but a small decrease in the production of packaged fish. There was a decrease in the production of shad on the Hudson River.

Chesapeake Bay States.—In 1933 the catch of fishery products in the Chesapeake Bay States decreased sharply, the volume being less than in any year since 1888 and the value to the fishermen was less than in any year for which there are records. Menhaden products, which are produced in Virginia, decreased in both volume and value and there was a decrease in the catch of shad in the Potomac River.

South Atlantic and Gulf States.—No survey for statistics of the catch of fishery products in these States was made for 1933. In 1932 the volume of the catch showed a small increase over the preceding year, but the value was less than in any year for which records were available since 1902. There was a considerable increase in the output of canned shrimp in 1933 but a decrease in the production of canned oysters.

Pacific Coast States.—Statistics of the Pacific Coast States for 1933 showed the largest volume of catch of fishery products of any year since 1929 and the largest value since 1930. There were increases in the packs of canned salmon, sardines, tuna and tunalike fishes, and mackerel and frozen fish.

Lake States.—No survey has yet been made for catch statistics of the fisheries of the Great Lakes and the international lakes of northern Minnesota for 1933. In 1932 the catch decreased somewhat under that of 1931.

Mississippi River and tributaries.—The most recent complete catch statistics of the fisheries of the Mississippi River and tributaries are those collected for the year 1931. As compared with 1922 when the most recent preceding survey was made, there was a decrease in the catch which was reflected principally in a smaller catch of fresh-water mussels. A survey made for Lakes Pepin and Keokuk and the Mississippi River between these two lakes showed a decrease in 1933 as compared with the preceding year. The production of mussel-shell buttons increased appreciably in 1933.

Alaska.—The catch of fishery products in Alaska in 1933 increased in both volume and value as compared with 1932. The pack of canned salmon was somewhat less in volume in 1933, but the value was considerably greater; the production of frozen fish increased in both volume and value; and the output of cured products decreased in volume and increased in value.

Fisheries of the United States and Alaska

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Products	New England, 1933, Area XXII		Middle Atlantic, 1933, Area XXIII		Chesapeake, 1933, Area XXIII		South Atlantic and Gulf, 1932, Areas XXIV and XXV		Pacific, 1933	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	461, 621	9, 593	142, 771	2, 266	189, 708	2, 055	184, 158	2, 715	840, 523	12, 793
Shellfish, etc	38, 315	3, 893	26, 982	2, 545	82, 672	3, 006	115, 759	3, 713	15, 307	1, 111
Whale products									4, 331	84
Total	499, 936	13, 486	169, 753	4, 811	272, 380	5. 061	299, 917	6, 428	860, 161	13, 988

Products	Lakes, 1932		Mississippi River and tributaries, 1931		Alaska, 1933		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	81, 829	4, 361	44, 062	2, 257	624, 687	8, 941	2, 569, 359	44, 981
Shellfish, etc	1, 915	28	38, 321	640	2, 709	148	321, 980	15, 084
Whale products					3, 378	69	7, 709	153
Total	83, 744	4, 389	82, 383	2, 897	630, 774	9, 158	2, 899, 048	60, 218

NOTE.—The roman numerals appearing under the names of the sections are the numbers given these areas by the North American Council on Fishery Investigations. It should be explained that there are included under these areas craft whose principal fishing ports are in the respective areas but at times they may fish elsewhere.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: BY SECTIONS

Item	New England, 1933	Middle Atlantic, 1933	Chesapeake, 1933	South Atlantic and Gulf,[1] 1932	Pacific, 1933
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	5,049	2,442	2,125	2,409	6,512
On boats and shore	12,024	6,132	18,017	19,151	12,161
Total	17,073	8,574	20,142	21,560	18,673
Vessels:					
Steam	24	19	25	------	5
Net tonnage	2,879	3,010	2,831	------	116
Motor	570	384	105	441	919
Net tonnage	16,602	6,121	1,761	6,646	24,866
Sail	1	4	157	71	5
Net tonnage	47	32	1,749	841	2,173
Total vessels	595	407	287	512	929
Total net tonnage	19,528	9,163	6,341	7,487	27,155
Boats:					
Motor	4,581	1,747	7,492	5,052	5,283
Other	3,819	2,123	5,937	7,797	1,238
Accessory boats	1,227	157	102	85	------
Apparatus:					
Haul seines	79	249	524	891	131
Purse seines	178	27	34	42	430
Lampara nets	------	------	------	------	201
Otter trawls (including all types and sizes)	566	197	27	1,680	18
Beam trawls	------	------	------	------	32
Paranzella nets	------	------	------	------	13
Gill nets	7,348	1,529	9,376	10,860	4,171
Trammel nets	------	------	------	358	52
Pound nets, trap nets, and weirs	457	574	2,570	1,737	436
Stop nets	------	96	6	7	------
Fyke nets	121	2,667	2,830	1,085	2,591
Bag nets and pocket nets	144	------	------	------	44
Other nets [3]	423	433	3,133	2,062	370
Hooks, baits, or snoods	3,617,680	622,304	1,437,984	324,694	1,245,282
Fish wheels	------	------	------	21	29
Eel pots and traps	4,774	7,324	8,870	1,325	------
Lobster pots	319,460	46,576	------	------	6,099
Crab, shrimp, crawfish pots, traps, drags, etc	3,407	10	------	4,635	20,334
Clam dredges	75	90	------	1	------
Crab dredges	------	86	130	------	------
Mussel dredges	1	2	------	------	------
Oyster dredges	107	353	716	577	4
Scallop dredges and drags	2,569	260	2	64	------
Crab scrapes	------	------	683	------	------
Tongs, rakes, hoes, forks, picks, grabs, etc	4,509	3,229	9,423	2,920	------
Abalone diving outfits	------	------	------	------	17
Sponge diving outfits	------	------	------	54	------
Other apparatus [5]	3,007	200	2	2,593	54

Item	Lakes, 1932	Mississippi River and tributaries, 1931	Alaska, 1933	Total
	Number	*Number*	*Number*	*Number*
Fishermen:				
On vessels	1,705	------	[2] 8,656	28,898
On boats and shore	5,227	15,884	------	88,596
Total	6,932	15,884	8,656	117,494
Vessels:				
Steam	106	------	3	182
Net tonnage	2,364	------	217	11,417
Motor	392	------	504	3,315
Net tonnage	4,055	------	7,370	67,421
Sail	------	------	------	238
Net tonnage	------	------	------	4,842
Total vessels	498	------	507	3,735
Total net tonnage	6,419	------	7,587	83,680

[1] Includes the fisheries of Lake Okeechobee, Fla.

[2] Includes persons in boat and shore fisheries.

[3] Includes dip nets, push nets, reef nets, cast nets, scap nets, and drag nets.

[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets; and box traps.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: By sections—Continued

Item	Lakes, 1932	Mississippi River and tributaries, 1931	Alaska, 1933	Total
	Number	*Number*	*Number*	*Number*
Boats:				
Motor	1,624	4,426	1,032	31,237
Other	1,535	10,120	3,186	35,755
Accessory boats	-------	-------	-------	1,571
Apparatus:				
Haul seines	332	1,013	102	3,321
Purse seines	-------	-------	445	1,156
Lampara nets	-------	-------	-------	201
Otter trawls (including all types and sizes)	-------	-------	-------	2,488
Beam trawls	-------	-------	11	43
Paranzella nets	-------	-------	-------	13
Gill nets	103,518	101	3,346	140,249
Trammel nets	226	518	-------	1,154
Pound nets, trap nets, and weirs	9,259	374	416	15,823
Stop nets	-------	-------	-------	109
Fyke nets	2,574	32,541	-------	44,409
Bag nets and pocket nets	-------	-------	-------	188
Other nets [3]	-------	191	-------	6,612
Hooks, baits, or snoods	960,513	2,459,179	(4)	10,667,636
Fish wheels	-------	-------	280	330
Eel pots and traps	-------	-------	-------	22,293
Lobster pots	-------	-------	-------	372,135
Crab, shrimp, crawfish pots, traps, drags, etc	2,910	456	992	32,744
Clam dredges	-------	-------	-------	166
Crab dredges	-------	-------	-------	216
Mussel dredges	-------	440	-------	443
Oyster dredges	-------	-------	-------	1,757
Scallop dredges and drags	-------	-------	-------	2,895
Crab scrapes	-------	-------	-------	683
Tongs, rakes, hoes, forks, picks, grabs, etc	126	3,994	-------	24,201
Abalone diving outfits	-------	-------	-------	17
Sponge diving outfits	-------	-------	-------	54
Crowfoot bars	360	4,480	-------	4,840
Other apparatus [5]	-------	3,781	-------	9,637

CATCH: By sections

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1933		South Atlantic and Gulf, 1932[1]		Pacific, 1933	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives	2,817	17	1,390	10	25,727	130	6,664	42	-------	-------
Amberjack	2	(6)	-------	-------	-------	-------	5	(6)	-------	-------
Anchovies	-------	-------	-------	-------	-------	-------	-------	-------	317	4
Barracuda	-------	-------	-------	-------	-------	-------	4	(6)	3,073	123
Black bass	-------	-------	-------	-------	77	6	310	22	-------	-------
Bluefish	921	76	3,252	132	803	35	2,131	78	-------	-------
Blue runner or hardtail	-------	-------	-------	-------	-------	-------	163	2	-------	-------
Bonito	52	2	247	14	19	1	-------	-------	-------	-------
Bowfin	-------	-------	-------	-------	-------	-------	2	(6)	-------	-------
Buffalofish	-------	-------	-------	-------	-------	-------	12	1	-------	-------
Butterfish	1,554	68	4,410	180	2,875	68	55	1	-------	-------
Cabio or crab eater	-------	-------	-------	-------	20	1	6	(6)	-------	-------
Cabrilla	-------	-------	-------	-------	-------	-------	-------	-------	85	3
Carp	-------	-------	390	35	598	28	128	6	411	3
Catfish and bullheads	-------	-------	76	6	982	32	4,364	139	172	20
Cero	-------	-------	3	(6)	-------	-------	13	1	-------	-------
Cigarfish	-------	-------	-------	-------	-------	-------	9	(6)	-------	-------
Cod	99,632	1,856	7,493	213	7	(6)	2	(6)	16,036	156
Corbina	-------	-------	-------	-------	-------	-------	-------	-------	(6)	(6)
Crappie	-------	-------	-------	-------	1	(6)	405	12	-------	-------
Crevalle	2	(6)	7	(6)	-------	-------	25	1	-------	-------
Croaker	2,497	36	2,048	48	16,042	211	4,675	50	-------	-------
Cunner	42	1	-------	-------	-------	-------	-------	-------	-------	-------
Cusk	6,109	73	4	(6)	-------	-------	-------	-------	-------	-------
Dolphin	-------	-------	(6)	(6)	1	(6)	12	(6)	-------	-------
Drum:										
Black	(6)	(6)	(6)	(6)	123	2	1,077	21	-------	-------
Red or redfish	2	(6)	9	(6)	59	2	2,083	78	-------	-------

[1] Includes the fisheries of Lake Okeechobee, Fla.
[3] Includes dip nets, push nets, reef nets, cast nets, scrap nets, and drag nets.
[4] Number not determined.
[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets and box traps.
[6] Less than 500 pounds or dollors.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1933		South Atlantic and Gulf, 1932		Pacific, 1933	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Eels:										
Common	518	35	680	60	312	16	65	2	-------	-------
Conger	41	1	16	1	-------	-------	-------	-------	-------	-------
Flounders	37, 795	1, 173	9, 253	363	1, 153	55	1, 396	54	11, 036	457
Flyingfish	-------	-------	-------	-------	-------	-------	-------	-------	16	1
Frigate mackerel	125	4	102	2	-------	-------	2	(6)	-------	-------
Garfish	-------	-------	-------	-------	-------	-------	(6)	(6)	-------	-------
Gizzard shad	-------	-------	-------	-------	144	3	19	(6)	-------	-------
Goosefish	-------	-------	10	(6)	-------	-------	-------	-------	-------	-------
Grayfish	13	(6)	7	(6)	-------	-------	-------	-------	471	9
Groupers	-------	-------	-------	-------	-------	-------	3, 301	67	-------	-------
Grunts	-------	-------	-------	-------	-------	-------	51	2	-------	-------
Haddock	160, 106	3, 646	8, 507	248	(6)	(6)	-------	-------	-------	-------
Hake	15, 320	203	162	3	23	1	10	(6)	38	(6)
Halibut	2, 457	236	53	7	-------	-------	-------	-------	24, 497	1, 568
Hardhead	-------	-------	-------	-------	-------	-------	-------	-------	157	8
Harvestfish or "starfish"	-------	-------	-------	-------	180	4	1, 077	12	-------	-------
Herring:										
Round	-------	-------	1	(6)	-------	-------	-------	-------	-------	-------
Sea	48, 086	211	666	6	-------	-------	-------	-------	1, 214	9
Herring smelt	12	(6)	-------	-------	-------	-------	-------	-------	-------	-------
Hickory shad	2	(6)	1	(6)	68	2	167	6	-------	-------
Hogfish	-------	-------	-------	-------	-------	-------	29	1	-------	-------
Horse mackerel	-------	-------	-------	-------	-------	-------	-------	-------	1, 011	12
Jewfish	-------	-------	-------	-------	-------	-------	38	1	-------	-------
Kingfish (California)	-------	-------	-------	-------	-------	-------	-------	-------	564	12
Kingfish or "king mackerel"	-------	-------	(6)	(6)	-------	-------	3, 301	120	-------	-------
King whiting or "kingfish"	40	1	158	15	74	2	652	13	-------	-------
Ladyfish	-------	-------	-------	-------	-------	-------	3	(6)	-------	-------
Launce	21	(6)	-------	-------	-------	-------	-------	-------	-------	-------
"Lingcod"	-------	-------	-------	-------	-------	-------	-------	-------	1, 972	58
Mackerel	40, 832	878	662	22	43	1	-------	-------	69, 615	420
Marlin	-------	-------	-------	-------	-------	-------	-------	-------	7	(6)
Menhaden	1, 029	3	79, 576	236	115, 990	386	89, 346	132	-------	-------
Mojarro	-------	-------	-------	-------	-------	-------	36	1	-------	-------
Mullet	9	(6)	318	9	64	3	25, 088	417	24	1
Mummichog	-------	-------	51	4	-------	-------	-------	-------	-------	-------
Muttonfish	-------	-------	-------	-------	-------	-------	203	9	-------	-------
Paddlefish or "spoonbill cat"	-------	-------	-------	-------	-------	-------	1	(6)	-------	-------
Permit	-------	-------	-------	-------	-------	-------	3	(6)	-------	-------
Pigfish	4	(6)	(6)	(6)	61	(6)	129	2	-------	-------
Pike or pickerel (jacks)	-------	-------	(6)	(6)	29	4	5	(6)	-------	-------
Pilchard	-------	-------	-------	-------	-------	-------	-------	-------	509, 805	1, 505
Pinfish	-------	-------	-------	-------	-------	-------	295	2	-------	-------
Pollock	15, 027	164	776	12	(6)	(6)	-------	-------	-------	-------
Pompano	-------	-------	(6)	(6)	4	(6)	590	81	5	2
Porkfish	-------	-------	-------	-------	-------	-------	(6)	(6)	-------	-------
Rock bass	-------	-------	-------	-------	-------	-------	-------	-------	349	15
Rockfishes	-------	-------	-------	-------	-------	-------	-------	-------	5, 138	164
Rosefish	264	3	-------	-------	-------	-------	-------	-------	-------	-------
Rudderfish	-------	-------	-------	-------	-------	-------	-------	-------	13	1
Sablefish	-------	-------	-------	-------	-------	-------	-------	-------	2, 716	74
Salmon:										
Atlantic	25	6	-------	-------	-------	-------	-------	-------	-------	-------
Blueback, red or sockeye	-------	-------	-------	-------	-------	-------	-------	-------	9, 866	875
Chinook or king	-------	-------	-------	-------	-------	-------	-------	-------	35, 114	2, 105
Chum or keta	-------	-------	-------	-------	-------	-------	-------	-------	8, 071	181
Humpback or pink	-------	-------	-------	-------	-------	-------	-------	-------	38, 599	907
Silver or coho	-------	-------	-------	-------	-------	-------	-------	-------	15, 042	600
Sculpin	-------	-------	-------	-------	-------	-------	-------	-------	68	4
Scup or porgies	4, 195	89	6, 359	92	1, 589	38	279	7	-------	-------
Sea bass	3, 999	121	2, 475	87	342	10	704	24	449	18
Sea bass, white (California)	-------	-------	-------	-------	-------	-------	-------	-------	1, 163	69
Sea robin	77	1	30	(6)	(6)	(6)	-------	-------	-------	-------
Shad	386	16	834	76	6, 191	573	1, 882	240	1, 606	36
Sharks	66	1	12	(6)	10	(6)	5, 051	12	-------	-------
Sheepshead, salt-water	(6)	(6)	(6)	(6)	-------	-------	673	14	59	1
Silver perch	-------	-------	-------	-------	1	(6)	-------	-------	-------	-------
Silversides	-------	-------	23	3	-------	-------	-------	-------	-------	-------
Skates	240	2	84	1	-------	-------	-------	-------	194	2
Skipper or "billfish"	5	(6)	-------	-------	-------	-------	-------	-------	-------	-------

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(6) Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1933		South Atlantic and Gulf, 1932		Pacific, 1933	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Smelt	551	60	(6)	(6)	-------	-------	-------	-------	2,560	64
Snapper:										
Mangrove	-------	-------	-------	-------	-------	-------	96	2	-------	-------
Red	-------	-------	-------	-------	-------	-------	6,359	315	-------	-------
Snook	-------	-------	-------	-------	-------	-------	323	8	-------	-------
Spanish mackerel	-------	-------	7	(6)	68	4	6,465	217	4	(6)
Splittail	-------	-------	-------	-------	-------	-------	-------	-------	17	(6)
Spot	33	(6)	528	8	747	19	1,680	20	-------	-------
Squawfish	-------	-------	-------	-------	-------	-------	-------	-------	1	(6)
Squeteague or "sea trout":										
Gray	369	14	7,874	227	13,464	263	3,992	74	-------	-------
Spotted	2	(6)	(6)	(6)	173	14	6,239	298	-------	-------
Squirrel hake	-------	-------	53	(6)	-------	-------	-------	-------	-------	-------
Steelhead trout	-------	-------	-------	-------	-------	-------	-------	-------	2,702	142
Striped bass	61	7	40	6	833	101	507	54	510	28
Sturgeon	8	1	29	3	9	2	45	5	91	2
Suckers	52	2	172	13	8	(6)	(6)	(6)	14	(6)
Sunfish	-------	-------	1	(6)	2	(6)	718	18	-------	-------
Surffishes (perch)	-------	-------	-------	-------	-------	-------	-------	-------	250	9
Swellfish	-------	-------	2	(6)	1	(6)	-------	-------	-------	-------
Swordfish	3,381	404	103	13	-------	-------	-------	-------	851	71
Tai	-------	-------	-------	-------	-------	-------	-------	-------	(6)	(6)
Tautog	484	16	132	12	6	(6)	-------	-------	-------	-------
Tenpounder	-------	-------	-------	-------	-------	-------	80	1	-------	-------
Thimble-eyed mackerel	78	2	25	(6)	11	(6)	-------	-------	-------	-------
Tilefish	207	10	1,350	68	-------	-------	-------	-------	-------	-------
Tomcod	2	(6)	8	(6)	-------	-------	-------	-------	1	(6)
Tripletail	-------	-------	-------	-------	-------	-------	2	(6)	-------	-------
Tuna and tunalike fishes:										
Albacore	-------	-------	-------	-------	-------	-------	-------	-------	2	(6)
Bluefin or horse mackerel	402	18	43	2	-------	-------	3	(6)	561	29
Bonito	-------	-------	-------	-------	-------	-------	-------	-------	2,252	40
Skipjack or striped	-------	-------	-------	-------	-------	-------	-------	-------	16,687	613
Yellowfin	-------	-------	-------	-------	-------	-------	-------	-------	51,076	2,275
Turbot	-------	-------	-------	-------	-------	-------	4	(6)	-------	-------
Whitebait	-------	-------	3	1	-------	-------	-------	-------	96	3
Whitefish	-------	-------	-------	-------	-------	-------	-------	-------	95	4
White perch	50	7	75	5	533	26	832	21	-------	-------
Whiting	9,419	97	2,147	21	1	(6)	-------	-------	-------	-------
Wolffish	2,197	32	26	1	-------	-------	-------	-------	-------	-------
Yellow perch	1	(6)	8	1	240	12	180	5	-------	-------
Yellowtail	-------	-------	-------	-------	-------	-------	92	4	3,899	88
Miscellaneous fish	-------	-------	-------	-------	-------	-------	-------	-------	151	2
Total	461,621	9,593	142,771	2,266	189,708	2,055	184,158	2,715	840,523	12,793
SHELLFISH, ETC.										
Abalone	-------	-------	-------	-------	-------	-------	-------	-------	551	80
Clams:										
Coquina	-------	-------	-------	-------	-------	-------	5	(6)	-------	-------
Hard	3,039	375	3,621	532	1,211	268	1,387	61	576	31
Pismo	-------	-------	-------	-------	-------	-------	-------	-------	26	6
Razor	358	16	-------	-------	-------	-------	-------	-------	587	84
Soft	9,431	476	1,135	64	-------	-------	-------	-------	63	14
Surf	59	4	526	24	-------	-------	-------	-------	-------	-------
Mixed	-------	-------	-------	-------	-------	-------	-------	-------	16	1
Conchs	-------	-------	35	2	-------	-------	2	(6)	-------	-------
Crabs:										
Hard	5,629	40	955	25	50,559	616	8,484	89	6,176	355
King	7	(6)	2,750	7	-------	-------	-------	-------	-------	-------
Soft	-------	-------	94	20	5,517	382	413	60	-------	-------
Stone	-------	-------	-------	-------	-------	-------	154	8	-------	-------
Crawfish	-------	-------	-------	-------	-------	-------	-------	-------	99	10
Lobsters:										
Common	9,088	1,608	724	138	(6)	(6)	-------	-------	-------	-------
Spiny	-------	-------	-------	-------	-------	-------	445	32	1,050	145
Mussels, sea	141	6	53	3	-------	-------	-------	-------	(6)	(6)
Octopus	-------	-------	-------	-------	-------	-------	1	(6)	56	3

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[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1933		South Atlantic and Gulf, 1932		Pacific, 1933	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
SHELLFISH ETC.—con.										
Oysters:										
Eastern, market, public	87	12	178	20	14,900	914	11,382	447	--------	--------
Eastern, market, private	5,070	735	13,755	1,428	10,253	812	4,368	264	60	23
Western, market	--------	--------	--------	--------	--------	--------	--------	--------	226	120
Japanese, market	--------	--------	--------	--------	--------	--------	--------	--------	2,843	187
Periwinkles and "cockles"	191	12	(6)	(6)	--------	--------	--------	--------	--------	--------
Scallops:										
Bay	621	204	49	17	--------	--------	153	14	10	2
Sea	2,158	267	2,197	216	73	8	--------	--------	--------	--------
Shrimp	41	2	86	15	(6)	(6)	88,262	2,036	2,141	36
Squid	1,076	19	792	16	145	3	9	(6)	824	14
Terrapin	--------	--------	1	(6)	12	3	23	4	--------	--------
Turtles	--------	--------	11	1	2	(6)	58	1	3	(6)
Frogs	--------	--------	--------	--------	--------	--------	1	(6)	--------	--------
Irish moss	12	1	--------	--------	--------	--------	--------	--------	--------	--------
Sponges	--------	--------	--------	--------	--------	--------	612	697	--------	--------
Bloodworms	661	71	11	10	--------	--------	--------	--------	--------	--------
Sandworms	640	45	9	7	--------	--------	--------	--------	--------	--------
Sea urchins	6	(6)	--------	--------	--------	--------	--------	--------	--------	--------
Total	38,315	3,893	26,982	2,545	82,672	3,006	115,759	3,713	15,307	1,111
WHALE PRODUCTS [7]										
Meat	--------	--------	--------	--------	--------	--------	--------	--------	2,214	43
Oil, whale	--------	--------	--------	--------	--------	--------	--------	--------	2,117	41
Total	--------	--------	--------	--------	--------	--------	--------	--------	4,331	84
Grand total	499,936	13,486	169,753	4,811	272,380	5,061	299,917	6,428	860,161	13,988

Species	Lakes, 1932		Mississippi River and tributaries, 1931		Alaska, 1933		Total	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives	--------	--------	--------	--------	--------	--------	36,598	199
Amberjack	--------	--------	--------	--------	--------	--------	7	(6)
Anchovies	--------	--------	--------	--------	--------	--------	317	4
Barracuda	--------	--------	--------	--------	--------	--------	3,077	123
Black bass	--------	--------	14	1	--------	--------	401	29
Bluefish	--------	--------	--------	--------	--------	--------	7,107	321
Blue pike	9,947	411	--------	--------	--------	--------	9,947	411
Blue runner or hardtail	--------	--------	--------	--------	--------	--------	163	2
Bonito	--------	--------	--------	--------	--------	--------	318	17
Bowfin	3	(6)	428	9	--------	--------	433	9
Buffalofish	2	(6)	15,772	687	--------	--------	15,786	688
Butterfish	--------	--------	--------	--------	--------	--------	8,894	317
Burbot	331	4	--------	--------	--------	--------	331	4
Cabio or crab eater	--------	--------	--------	--------	--------	--------	26	1
Cabrilla	--------	--------	--------	--------	--------	--------	85	3
Carp	4,234	119	11,892	456	--------	--------	17,433	647
Catfish and bullheads	833	46	10,267	878	--------	--------	16,694	1,121
Cero	--------	--------	--------	--------	--------	--------	16	1
Chubs	4,056	248	--------	--------	--------	--------	4,056	248
Cigarfish	--------	--------	--------	--------	--------	--------	9	(6)
Cisco	160	17	--------	--------	--------	--------	160	17
Cod	--------	--------	--------	--------	828	6	123,998	2,231
Corbina	--------	--------	--------	--------	--------	--------	(6)	(6)
Crappie	1	(6)	41	3	--------	--------	448	15
Crevalle	--------	--------	--------	--------	--------	--------	34	1
Croaker	--------	--------	--------	--------	--------	--------	25,262	345
Cunner	--------	--------	--------	--------	--------	--------	42	1
Cusk	--------	--------	--------	--------	--------	--------	6,113	73
Dolly Varden trout	--------	--------	--------	--------	44	2	44	2
Dolphin	--------	--------	--------	--------	--------	--------	13	(6)

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[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1932		Mississippi River and tributaries, 1931		Alaska, 1933		Total	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Drum:								
Black							1,200	23
Red or redfish							2,153	80
Eels:								
Common	43	1	7	1			1,625	115
Conger							57	2
Flounders					83	1	60,716	2,103
Flyingfish							16	1
Frigate mackerel							229	6
Garfish			73	1			73	1
Gizzard shad							163	3
Goldfish	49	1					49	1
Goosefish							10	(6)
Grayfish							491	9
Groupers							3,301	67
Grunts							51	2
Haddock							168,613	3,894
Hake							15,553	207
Halibut					15,632	726	42,639	2,537
Hardhead							157	8
Harvestfish or "starfish"							1,257	16
Herring:								
Round							1	(6)
Lake	11,686	181					11,686	181
Sea					140,581	703	190,547	929
Herring smelt							12	(6)
Hickory shad							238	8
Hogfish							29	1
Horse mackerel							1,011	12
Jewfish							38	1
Kingfish (California)							564	12
Kingfish or "king mackerel"							3,301	120
King whiting or "kingfish							924	31
Ladyfish							3	(6)
Lake trout	10,662	920					10,662	920
Launce							21	(6)
"Lingcod"							1,972	58
Mackerel							111,152	1,321
Marlin							7	(6)
Menhaden							285,941	757
Minnows			1	(6)			1	(6)
Mojarro							36	1
Mooneye	16	(6)	3	(6)			19	(6)
Mullet							25,503	430
Mummichog							51	4
Muttonfish							203	9
Paddlefish or "spoonbill cat"			952	43			953	43
Permit							3	(6)
Pigfish							194	2
Pike or pickerel (jacks)	373	16	5	1			412	21
Pilchard							509,805	1,505
Pinfish							295	2
Pollock							15,803	176
Pompano							599	83
Porkfish							(6)	(6)
Quillback			268	11			268	11
Rock bass	17	1					366	16
Rockfishes					5	(6)	5,143	164
Rosefish							264	3
Rudderfish							13	1
Sablefish					152	5	2,868	79
Salmon:								
Atlantic							25	6
Blueback, red or sockeye					209,325	3,749	219,191	4,624
Chinook or king					12,175	264	47,289	2,339
Chum or keta					71,030	707	79,101	838
Humpback or pink					159,090	2,522	197,689	3,429
Silver or coho					15,729	256	30,771	856
Sauger	3,448	136	2	(6)			3,450	136
Sculpin							68	4
Scup or porgies							12,422	226
Sea bass							7,969	260
Sea bass, white (California)							1,163	69
Sea robin							107	1
Shad							10,899	941

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[6] Less tean 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1932		Mississippi River and tributaries, 1931		Alaska, 1933		Total	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Sharks							5, 139	13
Sheepshead:								
Fresh-water	2, 158	44	3, 905	143			6, 063	187
Salt-water							732	15
Silver perch							1	(6)
Silversides							23	3
Skates							518	5
Skipper or "billfish"							5	(6)
Smelt	98	3			1	(6)	3, 210	127
Snapper:								
Mangrove							96	2
Red							6, 359	315
Snook							323	8
Spanish mackerel							6, 544	221
Splittail							17	(6)
Spot							2, 988	47
Squawfish							1	(6)
Squeteague or "sea trout":								
Gray							25, 699	578
Spotted							6, 414	312
Squirrel hake							53	(6)
Steelhead trout	5	1			12	(6)	2, 719	143
Striped bass							1, 951	196
Sturgeon	30	6					212	19
Sturgeon, shovelnose			87	8			87	8
Suckers	6, 192	137	315	13			6, 753	165
Sunfish	8	(6)	22	1			751	19
Surfishes (perch)							250	9
Swellfish							3	(6)
Swordfish							4, 335	488
Tai							(6)	(6)
Tautog							622	28
Tenpounder							80	1
Thimble-eyed mackerel							114	2
Tilefish							1, 557	78
Tomcod							11	(6)
Tripletail							2	(6)
Tullibee	1, 297	16					1, 297	16
Tuna and tunalike fishes:								
Albacore							2	(6)
Bluefin or horse mackerel							1, 009	49
Bonito							2, 252	40
Skipjack or striped							16, 687	613
Yellowfin							51, 076	2, 275
Turbot							4	(6)
White bass	253	10	3	(6)			256	10
Whitebait							99	4
Whitefish	9, 731	1, 102					9, 826	1, 106
Whitefish, Menominee	233	17					233	17
White perch							1, 490	59
Whiting							11, 567	118
Wolffish							2, 223	33
Yellow perch	11, 472	467					11, 901	485
Yellow pike	4, 441	457	5	1			4, 446	458
Yellowtail							3, 991	92
Miscellaneous fish							151	2
Total	81, 829	4, 361	44, 062	2, 257	624, 687	8, 941	2, 569, 359	44, 981
SHELLFISH, ETC.								
Abalone							551	80
Clams:								
Coquina							5	(6)
Hard					4	(6)	9, 838	1, 267
Pismo							26	6
Razor					1, 042	49	1, 987	149
Soft							10, 629	574
Surf							585	28
Mixed							16	1
Conchs							37	2
Crabs:								
Hard					1, 083	78	72, 886	1, 203
King							2, 757	7
Soft							6, 024	462
Stone							154	8

[6] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: By sections—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1932		Mississippi River and tributaries, 1931		Alaska, 1933		Total	
SHELLFISH, ETC.—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crawfish	20	1	29	(6)	--------	--------	148	11
Lobsters:								
Common	--------	--------	--------	--------	--------	--------	9,812	1,746
Spiny	--------	--------	--------	--------	--------	--------	1,495	177
Mussels, sea	--------	--------	--------	--------	--------	--------	194	9
Mussel shells	1,895	26	37,255	421	--------	--------	39,150	447
Octopus	--------	--------	--------	--------	--------	--------	57	3
Oysters:								
Eastern, market, public	--------	--------	--------	--------	--------	--------	26,547	1,393
Eastern, market, private	--------	--------	--------	--------	--------	--------	33,506	3,262
Western, market	--------	--------	--------	--------	--------	--------	226	120
Japanese, market	--------	--------	--------	--------	--------	--------	2,843	187
Periwinkles and "cockles"	--------	--------	--------	--------	--------	--------	191	12
Scallops:								
Bay	--------	--------	--------	--------	--------	--------	833	237
Sea	--------	--------	--------	--------	--------	--------	4,428	491
Shrimp	--------	--------	49	4	580	21	91,159	2,114
Squid	--------	--------	--------	--------	--------	--------	2,846	52
Terrapin	--------	--------	19	1	--------	--------	55	8
Turtles	--------	--------	94	3	--------	--------	168	5
Frogs	--------	--------	875	131	--------	--------	876	131
Irish moss	--------	--------	--------	--------	--------	--------	12	1
Sponges	--------	--------	--------	--------	--------	--------	612	697
Bloodworms	--------	--------	--------	--------	--------	--------	672	81
Sandworms	--------	--------	--------	--------	--------	--------	649	52
Pearls and slugs	--------	1	--------	80	--------	--------	--------	81
Sea urchins	--------	--------	--------	--------	--------	--------	6	(6)
Total	1,915	28	38,321	640	2,709	148	321,980	15,084
WHALE PRODUCTS								
Meat	--------	--------	--------	--------	--------	--------	2,214	43
Fertilizer	--------	--------	--------	--------	1,034	14	1,034	14
Oil, sperm	--------	--------	--------	--------	84	2	84	2
Oil, whale	--------	--------	--------	--------	2,260	53	4,377	94
Total	--------	--------	--------	--------	3,378	69	7,709	153
Grand total	83,744	4,389	82,383	2,897	630,774	9,158	2,899,048	60,218

CATCH: By states [8]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes [9]		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alabama	6,107	169	1,822	33	--------	--------	7,929	202
Arkansas	--------	--------	15,733	412	--------	--------	15,733	412
California	706,899	7,094	--------	--------	--------	--------	706,899	7,094
Connecticut	9,878	613	--------	--------	--------	--------	9,878	613
Delaware	36,527	209	--------	--------	--------	--------	36,527	209
Florida	101,920	2,917	--------	--------	1,370	56	103,290	2,973
Georgia	16,523	186	--------	--------	--------	--------	16,523	186
Illinois	--------	--------	14,263	367	885	58	15,148	425
Indiana	--------	--------	7,718	157	630	37	8,348	194
Iowa	--------	--------	7,778	303	--------	--------	7,778	303
Kansas	--------	--------	455	17	--------	--------	455	17
Kentucky	--------	--------	1,622	61	--------	--------	1,622	61
Louisiana	48,340	1,181	19,213	994	--------	--------	67,553	2,175
Maine	98,498	2,307	--------	--------	--------	--------	98,498	2,307

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[6] Less than 500 pounds or dollars.

[8] The catch under "Marine and coastal rivers" is for 1933 except in the South Atlantic and Gulf States which is for 1932; the catch of the "Mississippi River and tributaries" is for 1931; and the catch of the "Lakes" is for 1932.

[9] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee, and several mussel-bearing streams tributary to Lakes Huron, Erie, and Michigan.

Fisheries of the United States and Alaska—Continued

CATCH: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Maryland	55, 362	1, 734					55, 362	1, 734
Massachusetts	373, 670	9, 507					373, 670	9, 507
Michigan					30, 130	2, 162	30, 130	2, 162
Minnesota			3, 498	138	8, 507	199	12, 005	337
Mississippi	20, 603	497	2, 650	123			23, 253	620
Missouri			928	77			928	77
Nebraska			145	16			145	16
New Hampshire	523	57					523	57
New Jersey	93, 263	2, 146					93, 263	2, 146
New York	39, 911	2, 453			1, 435	112	41, 346	2, 565
North Carolina	86, 214	827					86, 214	827
Ohio			185	7	28, 516	1, 161	28, 701	1, 168
Oklahoma			40	4			40	4
Oregon	24, 533	1, 210					24, 533	1, 210
Pennsylvania	52	3			2, 535	167	2, 587	170
Rhode Island	17, 366	1, 001					17, 366	1, 001
South Carolina	4, 536	123					4, 536	123
South Dakota			114	11			114	11
Tennessee			3, 435	104			3, 435	104
Texas	14, 304	472	139	6			14, 443	478
Virginia	217, 018	3, 327					217, 018	3, 327
Washington	128, 730	5, 684					128, 730	5, 684
Wisconsin			2, 645	68	11, 107	493	13, 752	561
Alaska	630, 773	9, 158					630, 773	9, 158
Total	2, 731, 550	52, 875	82, 383	2, 898	85, 115	4, 445	2, 899, 048	60, 218

SEED OYSTER FISHERY

Item	New England, 1933		Middle Atlantic, 1933	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	93		1, 586	
On boats and shore:				
Regular	5		298	
Casual	160		150	
Total	258		2, 034	
Vessels:				
Steam	3			
Net tonnage	245			
Motor	18		7	
Net tonnage	271		69	
Sail	2		146	
Net tonnage	17		2, 977	
Total vessels	23		153	
Total net tonnage	533		3, 046	
Boats:				
Motor	7		206	
Other	90		152	
Apparatus:				
Dredges, oyster	101		300	
Yards at mouth	97		363	
Tongs	96		374	
Rakes	46		79	
CATCH				
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	31, 458	$12, 684	1, 003, 540	$261, 862
Seed, public, fall	43, 163	17, 265	23, 500	8, 250
Seed, private, spring	207, 185	69, 617	40, 290	39, 540
Seed, private, fall			38, 290	38, 290
Total	281, 806	99, 566	1, 105, 620	347, 942

Fisheries of the United States and Alaska—Continued

SEED OYSTER FISHERY—Continued

Item	Chesapeake, 1933		South Atlantic and Gulf, 1932		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels					1,679	
On boats and shore:						
Regular	1,650		12		1,965	
Casual	67				377	
Total	1,717		12		4,021	
Vessels:						
Steam					3	
Net tonnage					245	
Motor					25	
Net tonnage					340	
Sail					148	
Net tonnage					2,994	
Total vessels					176	
Total net tonnage					3,579	
Boats:						
Motor	804		6		1,023	
Other	286				528	
Apparatus:						
Dredges, oyster			12		413	
Yards at mouth			12		472	
Tongs	1,474				1,944	
Rakes	130				255	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	574,620	$60,880	39,741	$8,280	1,649,359	$343,706
Seed, public, fall	815,240	85,934			881,903	111,449
Seed, private, spring	35,600	7,720			283,075	116,877
Seed, private, fall	56,800	11,360			95,090	49,650
Total	1,482,260	165,894	39,741	8,280	2,909,427	621,682

NOTE.—Of the number of persons fishing for seed oysters, a total of 3,652 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 87 vessels, 823 motor boats, 437 other boats, 172 dredges, 1,570 tongs, and 61 rakes.

Yield of the fisheries of the United States: By gear

Gear	New England, 1933		Middle Atlantic, 1933		Chesapeake, 1933	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	56,586,422	$796,362	77,945,874	$205,503	115,343,100	$384,227
Haul seines	910,017	32,041	1,845,557	70,568	3,669,524	154,091
Gill nets	18,593,520	359,016	2,517,827	117,750	1,846,636	147,762
Lines	99,382,952	2,167,473	7,633,174	292,745	42,619,655	489,041
Pound nets	14,419,422	227,622	28,325,529	692,557	62,619,356	1,215,833
Floating traps	8,458,029	159,754				
Other traps	28,910	2,512				
Weirs	21,801,005	92,599	893,336	2,485		
Stop nets			208,874	20,472	63,504	2,308
Fyke nets	81,216	3,192	694,092	21,736	923,307	40,709
Dip nets	3,640,232	45,571	86,022	16,852	4,662,036	305,638
Cast nets			400	48		
Scap nets			149,664	8,574		
Bag and pocket nets	116,068	13,039				
Drag nets			51,900	10,855		
Push nets	18,000	7,000				
Otter trawls	235,003,844	5,296,742	24,410,956	780,076	5,455,375	129,812
Pots	15,081,503	1,673,370	[1] 2,369,400	[1] 203,269	167,225	9,452
Harpoons	3,481,594	406,727	102,386	12,549		
Spears	106,663	7,537	126,568	12,682	6,000	300
Scrapes, crab					2,001,916	65,929
Dredges	8,311,071	1,224,218	17,238,166	1,698,835	13,573,634	638,012
Tongs	1,443,961	202,993	2,618,049	372,867	18,357,340	1,309,318
Rakes	1,129,890	145,761	1,281,227	179,516	690,140	75,133
Forks	2,811,825	283,046	171,093	29,770		
Hoes	8,378,980	333,750	913,560	45,752		
Picks					279,864	69,464
Gaffs			750	75		
By hand	151,015	5,225	169,331	15,519	101,440	23,800
Total	499,936,139	13,485,550	169,753,735	4,811,055	272,380,052	5,060,829

Yield of the fisheries of the United States: By gear—Continued

Gear	South Atlantic and Gulf, 1932		Pacific, 1933		Lakes, 1932	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	89,971,248	$163,404	423,204,286	$2,672,000	-----	-----
Haul seines	24,175,742	602,678	3,824,178	199,434	4,538,616	$129,882
Gill nets	38,137,303	943,195	30,252,256	1,369,692	32,046,421	1,766,456
Trammel nets	3,159,789	118,055	661,335	41,492	205,545	4,140
Lines	25,218,356	764,227	136,182,745	5,680,665	2,307,481	206,357
Pound nets	10,763,098	190,839	26,648,553	1,297,707	9,207,975	466,941
Traps (other than floating)	-----	-----	-----	-----	30,098,291	1,626,039
Weirs	2,000	20	467,200	4,672	-----	-----
Wheels	263,000	1,505	763,235	56,339	-----	-----
Stop nets	891,793	15,055	-----	-----	-----	-----
Fyke nets	345,520	10,661	197,393	20,701	3,425,469	161,008
Dip nets	491,388	27,215	1,848,148	51,968	-----	-----
Drag bag nets	-----	-----	136,587	5,838	-----	-----
Cast nets	108,932	3,994	-----	-----	-----	-----
Bag and pocket nets	-----	-----	1,494,768	22,422	-----	-----
Reef nets	-----	-----	177,315	5,612	-----	-----
Lampara nets	-----	-----	203,895,501	863,526	-----	-----
Paranzella nets	-----	-----	11,549,104	451,971	-----	-----
Otter trawls	87,089,274	2,016,418	789,873	21,061	-----	-----
Beam trawls	-----	-----	656,187	15,548	-----	-----
Pots	1,117,738	50,446	7,264,551	506,478	19,677	984
Harpoons	-----	-----	5,190,295	155,663	-----	-----
Spears	155,803	9,036	-----	-----	-----	-----
Dredges	7,373,518	297,347	(2)	(2)	-----	-----
Tongs	6,049,736	368,583	[2] 4,396,438	[2] 464,770	-----	-----
Crowfoot bars	-----	-----	-----	-----	1,468,430	21,071
Rakes	312,476	20,913	(2)	(2)	-----	-----
Forks	281,340	11,356	-----	-----	-----	-----
Grabs	2,693,154	56,533	-----	-----	-----	-----
Picks	-----	-----	-----	-----	246,966	3,647
Hooks	335,203	234,967	-----	-----	-----	-----
Diving apparatus, abalone and sponge	278,824	462,077	351,268	80,433	-----	-----
By hand	701,493	59,861	-----	-----	179,518	2,536
Total	299,916,728	6,428,385	860,161,216	13,987,992	83,744,389	4,389,061

Gear	Mississippi River and tributaries, 1931		Total	
	Pounds	*Value*	*Pounds*	*Value*
Purse seines	-----	-----	763,070,930	$4,221,496
Haul seines	13,739,657	$574,541	52,703,291	1,763,235
Gill nets	166,598	6,547	123,570,561	4,710,418
Trammel nets	1,134,206	75,615	5,160,875	239,302
Lines	10,140,037	772,245	323,484,400	10,372,753
Pound nets	224,275	9,541	152,208,208	4,101,040
Floating traps	-----	-----	8,458,029	159,754
Other traps	-----	-----	30,127,201	1,628,551
Weirs	-----	-----	23,163,541	99,776
Wheels	-----	-----	1,026,235	57,844
Stop nets	-----	-----	1,164,171	37,835
Fyke nets	18,507,204	797,130	24,174,201	1,055,137
Dip nets	30,045	3,307	10,757,871	450,551
Drag bag nets	-----	-----	136,587	5,838
Cast nets	-----	-----	109,332	4,042
Scap nets	-----	-----	149,664	8,574
Bag and pocket nets	-----	-----	1,610,836	35,461
Drag nets	-----	-----	51,900	10,855
Push nets	-----	-----	18,000	7,000
Reef nets	-----	-----	177,315	5,612
Lampara nets	-----	-----	203,895,501	863,526
Paranzella nets	-----	-----	11,549,104	451,971
Otter trawls	-----	-----	352,749,322	8,244,109
Beam trawls	-----	-----	656,187	15,548
Pots	[1] 310,455	[1] 26,277	26,330,549	2,470,276
Harpoons	-----	-----	8,774,275	574,939
Spears	2,250	270	397,284	29,825
Scrapes, crab	-----	-----	2,001,916	65,929
Dredges	3,699,100	40,958	50,195,489	3,899,370
Tongs	1,601,876	21,091	34,467,400	2,739,622
Crowfoot bars	20,893,550	265,443	22,361,980	286,514
Rakes	370,130	4,029	3,783,863	425,352
Forks	4,812,737	76,214	8,076,995	400,386
Hoes	-----	-----	9,292,540	379,502
Grabs	873,099	130,621	3,566,253	187,154
Picks	-----	-----	526,830	73,111
Hooks	-----	-----	335,203	234,967
Diving apparatus, abalone and sponge	-----	-----	830,092	542,510
Gaffs	-----	-----	750	75
By hand	5,877,304	93,528	7,180,101	200,469
Total	82,382,523	2,897,357	2,268,274,782	51,060,229

[1] Includes the catch by baskets.
[2] The catch by shovels, rakes, and dredges is included with tongs.

Industries related to the fisheries of the United States and Alaska

Item	New England, 1933	Middle Atlantic, 1933	Chesapeake, 1933	South Atlantic and Gulf, 1931
Transporting:				
Persons engaged:				
On vessels	256	110	869	354
On boats	54	92	25	389
Total	310	202	894	743
Vessels:				
Steam	1	----	----	----
Net tonnage	67	----	----	----
Motor	104	30	421	152
Net tonnage	1,615	629	4,929	1,440
Sail	----	----	11	30
Net tonnage	----	----	307	279
Total vessels	105	30	432	182
Total net tonnage	1,682	629	5,236	1,719
Boats	31	87	102	251
Wholesale and manufacturing:				
Establishments	362	398	502	585
Persons engaged:				
Proprietors	266	358	664	700
Salaried employees	799	1,067	315	352
Wage earners:				
Average for season	8,112	4,206	10,617	12,583
Average for year	4,170	2,948	4,704	4,581
Salaries and wages paid	$5,410,072	$6,085,981	$2,366,762	$2,821,543
Manufactured products [4]	$14,322,274	$10,603,564	$7,245,169	[5] $7,680,627
Fishermen's manufactured products:				
Persons engaged	2,223	512	14	1,379
Products [4]	$553,235	$260,146	$3,548	$258,805

Item	Pacific, 1933	Lakes, 1931	Mississippi River and tributaries, 1931	Alaska, 1933	Total
Transporting:					
Persons engaged:					
On vessels	245	19	29	1,283	3,165
On boats	----	----	----	(1)	560
Total	245	19	29	1,283	3,725
Vessels:					
Steam	----	----	----	10	11
Net tonnage	----	----	----	18,367	18,434
Motor	104	9	8	282	1,110
Net tonnage	2,328	120	104	10,982	22,147
Sail	----	----	----	----	41
Net tonnage	----	----	----	----	586
Total vessels	104	9	8	292	1,162
Total net tonnage	2,328	120	104	29,349	41,167
Boats	----	----	----	[2] 618	1,089
Wholesale and manufacturing:					
Establishments	313	230	217	224	2,831
Persons engaged:					
Proprietors	347	225	204	11,756	70,824
Salaried employees	747	471	355		
Wage earners:					
Average for season	10,899	1,506	4,275		
Average for year	3,667	1,034	3,483	(3)	(3)
Salaries and wages paid	$6,095,492	$2,610,439	$3,080,430	(3)	(3)
Manufactured products [4]	$28,772,185	[5] $1,891,558	[5] $3,723,414	$31,099,801	$105,338,592
Fishermen's manufactured products:					
Persons engaged	168	106	216	(3)	(3)
Products [4]	$174,569	$63,844	$8,751	(3)	(3)

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[1] Included in vessels.
[2] Includes scows, houseboats, pile drivers, etc.
[3] Statistics not available.
[4] Includes packaged, cured, and canned fishery products and also byproducts.
[5] Includes data for 1933 on packaged and canned products and byproducts.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products, 4,029 have also been included as fishermen and 866 of the persons shown on transporting craft have also been included as fishermen.

MANUFACTURED FISHERY PRODUCTS

Statistics of the output of the various manufactured fishery products have been collected in considerable more detail for 1930, 1931, and 1933 than in previous years. In addition to statistics of the production of cured fishery products, canned fishery products, and fishery byproducts, data also have been collected on the output of packaged fishery products, including shucked oysters, fresh-cooked crab meat, and similar commodities, in the more recent surveys.

Since only a part of the United States was surveyed for general fishery statistics for 1933, the following compilation of manufactured fishery products consists of composite data based on the most recent statistics. The years covered by the data are indicated by footnotes.

Manufactured fishery products of the United States and Alaska [1]

Item	Quantity	Value
Alewives:		
Salted:		
Corned [2]......pounds	3,821,100	$59,522
Tight-pack cut [2]......do	5,553,858	130,237
Tight-pack roe [2]......do	395,180	13,924
Pickled [2]......do	[3] 2,118,700	59,537
Smoked [2]......do	272,435	10,425
Canned......standard cases	20,280	46,363
Roe, canned......do	28,513	111,644
Dry scrap......tons	612	15,777
Oil......gallons	30,900	3,518
Bluefish, smoked......pounds	250	46
Buffalofish, smoked [2]......do	469,700	135,855
Butterfish, smoked [2]......do	631,427	155,070
Cabrilla, fresh fillets......do	18,000	2,700
Carp, smoked [2]......do	173,822	53,556
Cisco, chubs, tullibee, and lake herring, smoked [2]......do	6,601,825	1,403,953
Cod:		
Fresh fillets......do	7,316,708	847,413
Frozen fillets......do	3,971,227	344,676
Fresh steaks and sticks......do	288,778	49,434
Salted:		
Green......do	[3] 6,927,287	231,678
Dry......do	1,446,514	84,064
Boneless, including absolutely boneless......do	9,517,111	1,645,689
Stockfish......do	31,220	3,085
Smoked fillets......do	1,128,228	167,659
Other smoked......do	10,400	1,116
Oil:		
Cod......gallons	45,331	22,152
Cod liver......do	19,552	14,708
Croaker, fresh fillets......pounds	30,500	3,720
Cusk:		
Fresh fillets......do	321,566	40,144
Fresh steaks and sticks......do	140,177	25,387
Salted:		
Green......do	[3] 61,650	1,288
Dry......do	33,972	1,593
Boneless, including absolutely boneless......do	28,835	3,469
Smoked fillets......do	195,803	25,331
Eels:		
Smoked [2]......do	115,504	31,678
Pickled......do	48	14
Flounders:		
Fresh fillets......do	3,488,222	532,812
Frozen fillets......do	267,524	35,539
Smoked fillets [2]......do	5,331	1,072
Groupers, fresh steaks and fillets......do	261,800	27,287
Haddock:		
Fresh fillets......do	16,693,543	1,986,554
Frozen fillets......do	18,386,191	1,457,883
Fresh sticks......do	69,168	12,559

[1] Data are for 1933 unless otherwise indicated.

[2] This item represents a combination of 1933 data in sections where available, and 1931 data in other sections.

[3] This is usually an intermediate product and although included in the total, may also be shown in its final stage of processing elsewhere in the table.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Haddock—Continued.		
Salted:		
Green ..... pounds	[3] 45,765	$1,091
Dry ..... do	52,032	2,550
Boneless, including absolutely boneless ..... do	98,295	19,220
Smoked fillets ..... do	149,214	26,928
Finnan haddie ..... do	1,171,354	134,818
Canned finnan haddie ..... standard cases	329	3,505
Hake:		
Fresh fillets ..... pounds	1,386,900	125,891
Frozen fillets ..... do	28,821	2,361
Fresh sticks ..... do	200,630	29,454
Salted:		
Green ..... do	[3] 408,653	11,195
Dry ..... do	277,670	8,896
Boneless, including absolutely boneless ..... do	581,201	47,851
Smoked fillets ..... do	33,282	4,586
Halibut:		
Fresh fillets ..... do	109,484	23,408
Frozen fillets ..... do	17,480	3,012
Herring, lake, salted [4] ..... do	4,252,250	102,925
Herring, sea:		
Salted ..... do	68,400	1,790
Roused ..... do	509,790	17,474
Spiced ..... do	189,758	10,120
Pickled [2] ..... do	3,256,200	59,244
Scotch-cure ..... do	12,651,328	586,331
Norwegian-cure ..... do	290,950	14,019
Dry-salted ..... do	54,200	2,020
Smoked:		
Bloaters, hard ..... do	948,642	45,853
Bloaters, soft ..... do	886,994	64,636
Bloaters, unclassified ..... do	121,620	12,971
Boneless ..... do	1,953,365	187,020
Lengthwise ..... do	114,915	9,456
Medium-scale ..... do	171,870	14,597
Kippered ..... do	239,855	29,139
Miscellaneous ..... do	3,850	231
Canned "sardines" ..... standard cases	980,906	2,397,348
Pearl essence ..... pounds	7,521	74,210
Meal ..... tons	11,913	374,123
Oil ..... gallons	3,174,212	402,157
Lake trout:		
Fresh fillets ..... pounds	12,005	2,676
Smoked [2] ..... do	429,630	102,196
"Lingcod" fresh fillets ..... do	157,475	20,220
Mackerel:		
Fresh fillets ..... do	46,065	7,593
Salted:		
Fillets ..... do	1,767,946	133,266
Split ..... do	1,396,180	95,396
Miscellaneous ..... do	1,225	86
Smoked [2] ..... do	175,631	28,368
Canned ..... standard cases	748,567	1,867,915
Meal ..... tons	1,278	35,554
Oil ..... gallons	83,778	10,302
Menhaden:		
Acid scrap ..... tons	9,481	173,280
Dry scrap ..... do	25,068	767,878
Meal ..... do	6,385	194,734
Oil ..... gallons	3,344,343	450,970
Mullet:		
Salted [4] ..... pounds	1,191,362	48,102
Roe, salted [4] ..... do	74,704	17,350
Paddlefish:		
Smoked [2] ..... do	373,800	166,760
Roe, salted [4] ..... do	1,595	812
Pike:		
Fresh fillets ..... do	2,744,585	547,646
Frozen fillets ..... do	330,888	63,207
Pilchard:		
Salted ..... do	73,400	4,454
Canned "sardines" ..... standard cases	1,539,446	3,805,168
Meal ..... tons	50,581	1,530,218
Flour ..... do	384	11,334
Oil ..... gallons	10,263,776	1,593,088

[2] This item represents a combination of 1933 data in sections where available, and 1931 data in other sections.

[3] This is usually an intermediate product and although included in the total, may also be shown in its final stage of processing elsewhere in the table.

[4] Data are for 1931.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Pollock:		
Fresh fillets and steaks ... pounds	443, 631	$37, 479
Frozen fillets ... do	1, 091, 401	65, 147
Salted:		
Green ... do	114, 145	2, 275
Dry ... do	983, 829	39, 119
Rockfishes, fresh fillets ... do	881, 800	132, 002
Sablefish:		
Fresh fillets ... do	113, 000	12, 760
Salted ... do	144, 700	9, 055
Kippered ... do	290, 022	40, 854
Smoked [2] ... do	116, 030	29, 426
Salmon:		
Salted:		
Dry ... do	1, 399, 532	55, 281
Pickled in brine ... do	1, 034, 950	73, 920
Mild-cured ... do	[3] 10, 494, 446	1, 891, 676
Miscellaneous ... do	15, 158	1, 584
Smoked [2] ... do	8, 228, 951	2, 256, 091
Kippered ... do	1, 662, 561	333, 912
Canned:		
Chinook or king ... standard cases	322, 448	3, 071, 445
Blueback, red or sockeye ... do	2, 320, 866	16, 379, 350
Silver or coho ... do	243, 310	1, 382, 076
Humpback or pink ... do	2, 722, 723	12, 235, 661
Chum or keta ... do	735, 568	3, 012, 159
Steelhead trout ... do	17, 550	161, 226
Meal ... tons	1, 657	50, 477
Oil ... gallons	187, 801	29, 761
Eggs, for bait, canned ... standard cases	3, 273	93, 115
Sea bass (Pacific coast):		
Black, fresh fillets ... pounds	260, 000	28, 600
White, fresh fillets ... do	147, 000	23, 900
Shad:		
Smoked and kippered [2] ... do	242, 109	47, 745
Canned ... standard cases	1, 148	3, 837
Roe, canned ... do	1, 108	24, 823
Sheepshead:		
Fresh fillets ... pounds	37, 502	4, 399
Smoked [4] ... do	617	77
Snapper, red:		
Fresh fillets ... do	25, 400	4, 500
Fresh steaks ... do	18, 600	3, 520
Spanish mackerel, fresh fillets ... do	2, 700	535
Spot, salted [4] ... do	63, 500	2, 601
Squeteagues:		
Fresh fillets ... do	80, 500	10, 638
Sun-dried [4] ... do	33, 148	6, 166
Squirrel hake, smoked ... do	50	5
Sturgeon:		
Smoked and kippered ... do	1, 529, 312	785, 970
Salted roe ... do	564	381
Caviar, canned ... standard cases	2, 596	333, 530
Trout (Dolly Varden), dried ... pounds	1, 500	30
Tuna:		
Canned:		
Albacore ... standard cases	54, 097	286, 301
Bluefin ... do	4, 179	21, 519
Bonito ... do	42, 439	170, 178
Striped ... do	225, 461	1, 022, 819
"Tonno" ... do	136, 740	852, 236
Yellowfin ... do	936, 299	4, 417, 676
Yellowtail ... do	43, 918	163, 756
Meal ... tons	6, 004	153, 300
White bass, fresh fillets ... pounds	50, 873	10, 050
Whitefish:		
Fresh fillets ... do	13, 988	3, 020
Smoked [2] ... do	2, 461, 295	647, 338
Caviar, canned ... standard cases	854	29, 754
Whiting, smoked ... pounds	50	5
Wolffish, fresh fillets ... do	85, 439	6, 262
Yellow perch:		
Fresh fillets ... do	760, 113	155, 432
Frozen fillets ... do	87, 721	16, 854
Crabs:		
Meat, packaged, fresh-cooked [2] ... do	6, 863, 844	1, 662, 497
Canned ... standard cases	9, 272	143, 517
Meal ... tons	800	11, 000
Dry scrap ... do	550	9, 412

[2] This item represents a combination of 1933 data in sections where available, and 1931 data in other sections.

[3] This is usually an intermediate product and although included in the total, may also be shown in its final stage of processing elsewhere in the table.

[4] Data are for 1931.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Crabs, king, meal and dry scrap .... tons	572	$17,005
Lobsters, meat, packaged, fresh-cooked .... pounds	79,020	86,420
Shrimp:		
Fresh and frozen, packaged [2] .... do	2,403,962	397,004
Sun-dried [2] .... do	1,469,152	321,857
Cooked and peeled [2] .... do	779,050	153,388
Canned .... standard cases	860,462	3,479,477
Meal or "bran" .... tons	1,179	24,540
Abalone, steaks .... pounds	531,698	143,262
Clams, hard:		
Fresh-shucked [2] .... gallons	13,932	22,197
Canned:		
Whole .... standard cases	32,704	82,044
Chowder .... do	169,613	621,421
Minced .... do	13,058	68,324
Broth, bouillon, and cocktail .... do	4,503	25,485
Juice .... do	7,327	28,938
Clams, razor:		
Fresh-shucked .... gallons	36,078	17,729
Canned:		
Whole and juice .... standard cases	2,214	17,061
Minced .... do	62,010	498,472
Clams, soft:		
Fresh-shucked .... gallons	129,286	120,024
Steamed .... pounds	[3] 161,887	11,279
Canned:		
Whole .... standard cases	76,698	248,190
Chowder .... do	46,732	131,314
Juice and bouillon .... do	19,441	44,157
Clams, surf, fresh-shucked .... gallons	5,922	4,050
Clam shells, ground, poultry feed .... tons	1,630	15,340
Marine-shell products:		
Buttons .... gross	5,486,180	3,299,907
Novelties	----------	463,093
Mussels, fresh-water, shell products:		
Buttons .... gross	18,714,008	4,232,036
Novelties	----------	153,760
Lime .... tons	3,083	8,920
Poultry feed .... do	8,312	63,645
Oysters:		
Eastern:		
Fresh-shucked [2] .... gallons	5,535,219	6,697,956
Canned .... standard cases	317,630	927,128
Japanese:		
Fresh-shucked .... gallons	151,384	166,361
Canned .... standard cases	30,500	149,190
Native, Pacific, fresh-shucked .... gallons	26,575	139,884
Shell products:		
Poultry feed .... tons	276,342	1,480,398
Lime .... do	45,660	104,524
Lime, "burned" .... do	3,314	22,948
Scallops, bay, fresh-shucked [2] .... gallons	126,162	306,921
Scallops, sea, fresh-shucked .... do	381,650	397,733
Turtles and terrapin, meat and soup, canned .... standard cases	2,607	42,008
Whales:		
Meal, bone .... tons	207	4,453
Meal, meat .... do	310	9,320
Oil, whale .... gallons	569,850	93,341
Oil, sperm .... do	16,200	2,900
Unclassified products:		
Fillets, fresh .... pounds	[5] 526,400	84,909
Fillets, frozen .... do	[6] 183,299	21,271
Miscellaneous, packaged, fresh and frozen [2] .... do	[7] 1,637,453	154,533
Salted [2] .... do	[8] 424,026	35,947
Smoked [2] .... do	[9] 43,407	10,561
Canned:		
Fish for cat and dog food .... standard cases	213,811	588,090
Fish cakes, balls, etc .... do	65,100	444,236

[2] This item represents a combination of 1933 data in sections where available, and 1931 data in other sections.

[3] This is usually an intermediate product and although included in the total, may also be shown in its final stage of processing elsewhere in the table.

[5] Includes fresh fillets of barracuda, bluefish, grayfish, kingfish, lake herring, mullet, red drum, snook, and totuava.

[6] Includes frozen fillets of cusk, mackerel, red snapper, rosefish, salmon, sheepshead, Spanish mackerel, squeteagues, white bass, and wolffish.

[7] Includes fresh alewife roe, fresh-shucked conchs, pan-dressed flounders, fresh and frozen swordfish steaks, and frozen whiting sticks.

[8] Includes salted anchovies, barracuda, bluefish, bonito, halibut, lake trout, black and white sea bass, Spanish mackerel, yellowtail, and tongues; spiced alewives; and mild-cured shad.

[9] Includes smoked goosefish, halibut, salmon and shad weiners, suckers, and spiced salmon.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Unclassified products—Continued.		
Fish flakes ... standard cases	20,076	$155,424
Other ... do	[10] 30,592	212,053
Dry and green scrap ... tons	[11] 3,167	58,926
Meal ... do	[12] 9,843	435,965
Oil ... gallons	[13] 6,479	1,622
Glue ... do	355,949	704,101
Other byproducts		[14] 341,289
Total, fresh and frozen packaged products [2] ... pounds	129,608,348	17,294,092
Total, cured products [2] ... do	104,310,213	12,823,491
Total, canned ... do	533,212,154	59,799,963
Total, byproducts		17,465,986
Grand total		107,383,532

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[2] This item represents a combination of 1933 data in sections where available, and 1931 data in other sections.

[10] Includes canned anchovies, pickled eels, groundfish roe, haddock chowder, smoked lingcod, mackerel stew, salmon caviar, kippered salmon cheeks and steelhead trout, smoked sturgeon, conch cocktail, coquina broth, oyster puree, oyster soup, pickled sea mussels, rat poison, sea cucumber, squid, and miscellaneous canned fish.

[11] Includes scrap from sea herring, ground fish, and mixed fish.

[12] Includes meal from ground fish, salmon eggs, clams, and mixed fish.

[13] Includes shark and miscellaneous fish oil.

[14] Includes agar agar, alligator hides, concentrated powdered fish meat, isinglass, kelp products, mussel-shell stucco and chips, shark fins and hides, and miscellaneous novelties.

NOTE.—Some of the above products may have been manufactured from products imported from another country; therefore, they cannot be correlated directly with the catch within the United States and Alaska.

CANNED FISHERY PRODUCTS AND BYPRODUCTS TRADE

The output of canned fishery products and byproducts in the United States and Alaska in 1933 was valued at $77,258,318. Of this total, canned products comprised $59,799,963, and byproducts, $17,458,355, an increase of 37 percent in the value of canned products and 40 percent in the value of byproducts when compared with the respective values of the same groups of commodities for the previous year.

Fishery products were canned at 384 establishments in the United States and Alaska during 1933. The combined output of these canneries amounted to 13,116,968 standard cases. The net weight of the products canned amounted to 533,212,154 pounds.

Canned fishery products or byproducts were prepared in 26 States and in Alaska during 1933. Alaska ranked first in the value of the products, accounting for 38 percent of the total; and California ranked second with 22 percent.

Canned fishery products and byproducts of the United States and Alaska, 1933

SUMMARY OF PRODUCTION: BY COMMODITIES

Product	Number of plants	Standard cases	Quantity	Value
Canned products:				
Salmon:			*Pounds*	
United States	43	1,136,861	54,569,328	$7,865,903
Alaska	91	5,225,604	250,828,992	28,376,014
Sardines:				
Maine	23	980,906	24,522,650	2,397,348
California	19	1,539,446	73,893,408	3,805,168
Tuna and tunalike fishes	13	1,443,133	34,635,192	6,934,485
Alewives	11	20,280	973,440	46,363
Alewife roe	26	28,513	1,368,624	111,644
Shad	4	1,148	55,104	3,837
Shad roe	9	1,108	53,184	24,823
Mackerel	14	748,567	35,931,216	1,867,915
Fish flakes	4	20,076	963,648	155,424
Fish cakes, balls, etc	7	65,100	3,124,800	444,236

Canned fishery products and byproducts of the United States and Alaska, 1933—Con.

SUMMARY OF PRODUCTION: BY COMMODITIES—Continued

Product	Number of plants	Standard cases	Quantity	Value
Canned products—Continued.			*Pounds*	
Cat and dog food	6	213,811	10,262,928	$588,090
Sturgeon caviar	4	2,596	124,608	333,530
Whitefish roe and caviar	4	854	40,992	29,754
Salmon eggs (for bait)	8	3,273	157,104	93,145
Miscellaneous fish, roe, and caviar	17	12,110	581,280	85,729
Oysters	40	348,130	5,221,950	1,076,318
Shrimp	58	860,462	24,201,126	3,479,477
Clam products	65	434,500	[1] 10,239,060	1,766,406
Crabs	10	9,272	445,056	143,517
Turtle and terrapin products	5	2,607	125,136	42,008
Miscellaneous shellfish	6	18,611	893,328	128,829
Total	[2] 384	13,116,968	533,212,154	59,799,963
Byproducts:			*Tons*	
Oyster-shell products			326,946	1,623,210
Fresh-water mussel-shell products				4,493,111
Marine pearl-shell products				3,763,000
Scrap, meal, etc			129,991	3,877,296
			Gallons	
Marine animal oils			17,742,222	2,624,519
Miscellaneous byproducts				1,077,219
Total				17,458,355
Grand total				77,258,318

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[1] "Cutout" or "drained" weights of can contents are included for whole and minced clams, and gross can contents for other clam products.

[2] Exclusive of duplication.

VALUE OF PRODUCTION: BY STATES

State	Canned products	Byproducts [3]	Total
Maine	$2,941,678	$246,713	$3,188,391
Massachusetts	791,864	1,261,165	2,062,752
Rhode Island		9,723	
Connecticut		719,213	719,213
New York	843,803	1,532,536	4,466,269
New Jersey		1,416,759	
Pennsylvania		673,171	
Delaware		202,531	202,531
Maryland	121,568	654,776	776,344
Virginia	91,765	867,039	958,804
North Carolina and South Carolina	363,176	239,542	602,718
Georgia	515,903	675,053	1,658,854
Florida	467,898		
Alabama	329,911	62,450	1,366,654
Mississippi	974,293		
Louisiana	1,572,942	622,403	2,195,345
Texas and Wisconsin	317,486	4,659	322,145
Missouri, Illinois, and Kentucky		112,808	112,808
Iowa		3,364,028	3,364,028
Washington	5,801,293	75,678	5,876,971
Oregon	2,674,923	16,240	2,691,163
California	13,231,561	3,868,736	17,100,297
Alaska	28,759,899	833,132	29,593,031
Total	59,799,963	17,458,355	77,258,318

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[3] Includes menhaden, fresh-water mussel-shell, and marine-pearl shell products.

Canned fishery products and byproducts of the United States and Alaska, 1933—Con.

PACK OF CANNED SALMON: STANDARD CASES

Product	Alaska							
	Southeast		Central		Western		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	3,873	$21,111	12,578	$69,964	4,986	$28,929	21,437	$120,004
1-pound flat	3,189	27,608	3,811	31,032	3,021	28,480	10,021	87,120
½-pound flat	1,084	9,676	7,397	79,637	1,474	14,745	9,955	104,058
Total	8,146	58,395	23,786	180,633	9,481	72,154	41,413	311,182
Blueback, red or sockeye:								
1-pound tall	64,467	421,349	389,169	2,532,373	1,612,957	10,711,792	2,066,593	13,665,514
1-pound flat	3,832	30,656	54,651	411,717	1,569	10,277	60,052	452,650
½-pound flat	12,827	121,842	40,664	392,209	147	1,073	53,638	515,124
Total	81,126	573,847	484,484	3,336,299	1,614,673	10,723,142	2,180,283	14,633,288
Silver or coho:								
1-pound tall	90,737	472,569	62,351	313,521	1,456	7,517	154,544	793,607
1-pound flat	2,036	12,576	2,561	14,133	---------	----------	4,657	26,709
½-pound flat	2,972	22,335	395	2,368	---------	----------	3,367	24,703
Total	95,805	507,480	65,307	330,022	1,456	7,517	162,568	845,019
Humpback or pink:								
1-pound tall	1,467,473	6,664,922	700,221	3,116,508	---------	----------	2,167,694	9,781,430
½-pound flat	10,540	64,660	4,317	27,629	---------	----------	14,857	92,289
Total	1,478,013	6,729,582	704,538	3,144,137	---------	----------	2,182,551	9,873,719
Chum or keta:								
1-pound tall	424,611	1,728,120	207,471	865,780	26,049	115,254	658,131	2,709,154
½-pound flat	250	1,365	408	2,287	---------	----------	658	3,652
Total	424,861	1,729,485	207,879	868,067	26,049	115,254	658,789	2,712,806
Grand total	2,087,951	9,598,789	1,485,994	7,859,158	1,651,659	10,918,067	5,225,604	28,376,014

Product	United States						Grand total, Alaska and United States	
	Washington		Oregon and California		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	15,597	$69,727	34,210	$142,644	49,807	$212,371	71,244	$332,375
1-pound oval	210	3,728	697	12,372	907	16,100	907	16,100
1-pound flat	8,502	67,451	39,181	332,854	47,683	400,305	57,704	487,425
½-pound oval	---------	---------	106	2,672	106	2,672	106	2,672
½-pound flat	50,258	536,300	128,259	1,529,797	178,517	2,066,097	188,472	2,170,155
¼-pound flat	---------	---------	4,015	62,718	4,015	62,718	4,015	62,718
Total	74,567	677,206	206,468	2,083,057	281,035	2,760,263	322,448	3,071,445
Blueback, red or sockeye:								
1-pound tall	2,473	21,954	---------	---------	2,473	21,954	2,069,066	13,687,468
1-pound flat	24,800	285,200	---------	---------	24,800	285,200	84,852	737,850
½-pound flat	106,807	1,350,899	6,238	83,901	113,045	1,434,800	166,683	1,949,924
¼-pound flat	---------	---------	265	4,108	265	4,108	265	4,108
Total	134,080	1,658,053	6,503	88,009	140,583	1,746,062	2,320,866	16,379,350
Silver or coho:								
1-pound tall	17,817	89,477	4,227	21,135	22,044	110,612	176,588	904,219
1-pound flat	10,704	59,942	9,146	51,218	19,850	111,160	24,507	137,869
½-pound flat	17,809	139,801	15,077	118,354	32,886	258,155	36,253	282,858
¼-pound flat	495	4,811	5,467	52,319	5,962	57,130	5,962	57,130
Total	46,825	294,031	33,917	243,026	80,742	537,057	243,310	1,382,076
Humpback or pink:								
1-pound tall	505,380	2,173,134	---------	---------	505,380	2,173,134	2,673,074	11,954,564
1-pound flat	15,109	70,710	---------	---------	15,109	70,710	15,109	70,710
½-pound flat	19,683	118,098	---------	---------	19,683	118,098	34,540	210,387
Total	540,172	2,361,942	---------	---------	540,172	2,361,942	2,722,723	12,235,661

Canned fishery products and byproducts of the United States and Alaska, 1933—Con.

Product	United States						Grand total, Alaska and United States	
	Washingnon		Oregon and California		Total			
Chum or keta:	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
1-pound tall	46, 508	$181, 593	26, 191	$98, 272	72, 699	$279, 865	730, 830	$2, 989, 019
1-pound flat	1, 773	7, 535	444	1, 820	2, 217	9, 355	2, 217	9, 355
½-pound flat	1, 498	8, 089	365	2, 044	1, 863	10, 133	2, 521	13, 785
Total	49, 779	197, 217	27, 000	102, 136	76, 779	299, 353	735, 568	3, 012, 159
Steelhead:								
1-pound tall	375	1, 561	2, 008	8, 233	2, 383	9, 794	2, 383	9, 794
1-pound flat	996	6, 523	1, 143	7, 487	2, 139	14, 010	2, 139	14, 010
½-pound oval	389	5, 018	3, 924	50, 620	4, 313	55, 638	4, 313	55, 638
½-pound flat	1, 721	15, 803	5, 926	55, 408	7, 647	71, 211	7, 647	71, 211
¼-pound flat			1, 068	10, 573	1, 068	10, 573	1, 068	10, 573
Total	3, 481	28, 905	14. 069	132, 321	17, 550	161, 226	17, 550	161, 226
Grand total	848, 904	5, 217, 354	287, 957	2, 648, 549	1, 136, 861	7, 865, 903	6, 362, 465	36, 241, 917

NOTE.—"Standard cases" represent the various-sized cases converted to the equivalent of forty-eight 1-pound cans to the case. Salmon were canned at 31 plants in Washington, 11 in Oregon, 1 in California, and 91 in Alaska.

PACK OF CANNED SARDINES

Sardines (herring)	Maine	
Quarters, ¼-pound (100 cans):	*Cases*	*Value*
In cottonseed oil	[4] 821, 388	$2, 000, 218
In mustard	89, 061	252, 237
In other sauces or oils	7, 786	29, 673
Three-quarters, ¾-pound (48 cans):		
In mustard	43, 522	115, 220
Total	961, 757	2, 397, 348
Total (standard cases)	980, 906	

Sardines (pilchard)	California	
1-pound oval (48 cans):	*Cases*	*Value*
In cottonseed oil	13, 871	$32, 810
In mustard	128, 128	311, 960
In tomato sauce	1, 160, 029	2, 819, 755
In natural oil	21, 991	50, 652
In other sauces or oils	8, 579	21, 237
½-pound oval (48 cans):		
In various sauces or oils	4, 604	13, 571
1-pound tall (48 cans):		
In natural oil	105, 087	227, 456
In other sauces or oils	20, 403	49, 255
6-ounce (100 cans):		
In tomato sauce	4, 247	10, 251
In natural oil	83, 183	201, 640
In other sauces or oils	4, 576	11, 843
Other sizes:		
In various sauces or oils (standard cases)	7, 176	54, 738
Total	1, 561, 874	3, 805, 168
Total (standard cases)	1, 539, 446	

[4] Includes a small amount packed in 6-ounce cans, 100 to the case, which have been converted to the basis of 4-ounce cans, 100 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the uniform basis of one hundred ¼-pound cans to the case of sardines (herring), and forty-eight 1-pound cans to the case of sardines (pilchard). Sardines were canned at 23 plants in Maine and 19 in California.

PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA[5]

Size	Albacore		Yellowfin[6]		Bluefin		Striped	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)	1, 242	$4, 667	112, 982	$380, 829	1, 345	$5, 320	18, 687	$60, 107
½-pound (48 cans)	41, 404	227, 023	643, 373	3, 071, 470	2, 539	12, 063	187, 963	852, 653
1-pound (48 cans)	[7] 4, 257	[7] 39, 713	[7] 69, 383	[7] 592, 069	244	2, 122	10, 040	81, 023
Flakes (standard cases)	3, 558	14, 898	97, 669	373, 308	480	2, 014	8, 074	29, 036
Total	50, 461	286, 301	923, 407	4, 417, 676	4, 608	21, 519	224, 764	1, 022, 819
Total (standard cases)	54, 097		936, 299		4, 179		225, 461	

[5] Includes a very small amount of tuna packed in Oregon which has been included with albacore in ½-pound cans, 48 to the case.

[6] Includes a small amount of creamed yellowfin tuna.

[7] Includes the pack in 4-pound cans, 12 to the case, which have been converted to the equivalent of 1-pound cans, 48 to the case.

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PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA—Continued

Size	"Tonno"		Bonito		Yellowtail		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)			21	$63			134,277	$450,986
¼-pound (100 cans)	119,620	$775,423	4,247	23,867			123,867	799,290
½-pound (48 cans)	12,143	76,813	[8] 28,764	[8] 114,751	23,088	$91,425	939,274	4,446,198
1-pound (48 cans)			4,620	31,497	10,415	72,331	98,959	818,755
Flakes (standard cases)			([8])	([8])			109,781	419,256
Total	131,763	852,236	37,652	170,178	33,503	163,756	1,406,158	6,934,485
Total (standard cases)	136,740		42,439		43,918		1,443,133	

[8] A small amount of bonito flakes is included with canned bonito in ½-pound cans, 48 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight ½-pound cans to the case. Tuna and tunalike fishes were canned at 12 plants in California and 1 in Oregon.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: STANDARD CASES

Product	Maryland		Virginia and North Carolina		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Alewives	16,575	$36,500	3,705	$9,863	20,280	$46,363
Alewife roe	7,336	29,390	21,177	82,254	28,513	111,644
Total	23,911	65,890	24,882	92,117	48,793	158,007

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: ACTUAL CASES

Product and size	Cases	Value	Product and size	Cases	Value
Alewives:			Alewife roe—Continued.		
16-ounce (48 cans)	14,678	$34,831	10-, 16-, and 19-ounce (24 cans)	4,988	$9,061
16-, 17-, and 19-ounce (24 cans)	10,111	11,532	17-ounce (24 cans)	43,486	85,974
Total		46,363	Total		111,644
Alewife roe:			Grand total		158,007
8-ounce (48 cans)	4,851	13,583			
7½, 8½, and 10-ounce (48 cans)	875	3,026			

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case. Alewives or alewife roe were canned at 7 plants in Maryland, 17 in Virginia, and 2 in North Carolina.

PACK OF CANNED SHRIMP: STANDARD CASES

State	Dry pack (in tins)		Wet pack (in tins)		Wet pack (in glass)		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
South Carolina and Alabama	21,813	$91,358	71,883	$291,073			93,696	$382,431
Georgia	10,675	33,105	86,813	344,285	[9] 24,114	[9] $158,875	121,602	536,265
Florida	3,579	12,357	65,179	205,658	17,255	125,194	86,013	343,209
Mississippi	38,690	144,759	81,182	302,313			119,872	447,072
Louisiana	108,932	456,833	263,823	1,044,243	([9])	([9])	372,755	1,501,076
Texas	22,037	89,676	44,487	179,748	([9])	([9])	66,524	269,424
Total	205,726	828,088	613,367	2,367,320	41,369	284,069	860,462	3,479,477

[9] The pack of shrimp in glass for Louisiana and Texas has been included with that of Georgia to avoid disclosure of private enterprise.

PACK OF CANNED SHRIMP: ACTUAL CASES

Size	Cases	Value	Size	Cases	Value
In tins, dry:			In glass, wet:		
4-ounce (48 cans)	1,111	$3,393	4-ounce (24 jars)	2,140	$13,607
5-ounce (48 cans)	180,930	719,132	6-ounce (24 jars)	46,900	158,834
8¼-ounce (24 cans)	26,310	102,425	Other sizes (standard cases)	16,157	111,628
Other sizes (standard cases)	2,202	3,138			
In tins, wet:			Total		3,479,477
5¾-ounce (48 cans)	610,592	2,353,476			
9¾-ounce (24 cans)	2,478	9,506			
Other sizes (standard cases)	674	4,338			

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 5-ounce cans to the case in the dry pack and forty-eight 5¾-ounce cans to the case in the wet pack. Shrimp were canned at 1 plant in South Carolina, 6 in Georgia, 7 in Florida, 3 in Alabama, 15 in Mississippi, 21 in Louisiana, and 5 in Texas.

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PACK OF CANNED OYSTERS: STANDARD CASES

State	Cases	Value
South Carolina	93, 082	$274, 674
Georgia, Florida, Alabama, and New Jersey	21, 982	65, 069
Mississippi	183, 127	527, 221
Louisiana	19, 439	$60, 164
Washington	30, 500	149, 190
Total	348, 130	1, 076, 318

PACK OF CANNED OYSTERS: ACTUAL CASES

Size	Cases	Value
4-ounce (48 cans)	24, 150	$69, 971
5-ounce (48 cans)	252, 588	744, 211
7½-ounce (48 cans)	14, 086	103, 389
8-ounce (24 cans)	16, 675	42, 136
10-ounce (24 cans)	38, 758	$103, 731
Other sizes (standard cases)	2, 993	12, 880
Total		1, 076, 318

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 5-ounce cans to the case. Oysters were canned at 1 plant in New Jersey, 4 in South Carolina, 2 in Georgia, 2 in Florida, 2 in Alabama, 15 in Mississippi, 5 in Louisiana, and 9 in Washington.

PACK OF CANNED CLAMS AND CLAM PRODUCTS

Item and State	Cases	Value
Razor clams (Washington, Oregon, and Alaska):		
Whole:		
½-pound, 4-ounce (48 cans)	116	$540
No. 1, 5-ounce (48 cans)	1, 309	12, 731
1-pound, 8-ounce (48 cans)	299	2, 410
Other sizes (standard cases)	46	382
Minced:		
½-pound, 4-ounce (48 cans)	52, 903	347, 267
No. 1, 5-ounce (48 cans)	19, 278	148, 292
No. 2, 10-ounce (24 cans)	370	2, 713
Other sizes (standard cases)	40	200
Juice:		
All sizes (standard cases)	288	998
Total	74, 649	515, 533
Total (standard cases)	64, 224	
Hard clams (Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Florida, Washington, and Alaska):[10]		
Whole:		
No. 1, 5-ounce (48 cans)	1, 598	11, 081
1-pound, 8-ounce (48 cans)	1, 512	9, 292
No. 2, 10-ounce (24 cans)	3, 293	18, 501
No. 10, 52-ounce (6 cans)	3, 864	16, 422
Other sizes (standard cases)	20, 371	26, 745
Minced:		
½-pound, 4-ounce (48 cans)	6, 167	20, 043
No. 1, 5-ounce (48 cans)	1, 969	9, 386
Other sizes (standard cases)	6, 155	38, 895
Chowder:		
No. 1, 10-ounce (48 cans)	114, 468	378, 931
33-ounce (12 cans)	20, 330	74, 077
No. 10, 102-ounce (6 cans)	2, 052	12, 521
Other sizes (standard cases)	35, 756	155, 892
Hard clams—Continued.		
Juice:		
No. 1, 10-ounce (48 cans)	971	$3, 581
No. 10, 102-ounce (6 cans)	1, 990	5, 450
Other sizes (standard cases)	3, 818	19, 907
Cocktail: All sizes (standard cases)	1, 167	6, 498
Broth and bouillon:		
All sizes (standard cases)	3, 536	19, 987
Total	229, 017	827, 212
Total (standard cases)	227, 405	
Soft clams (Maine and Massachusetts):		
Whole:		
No. 1, 5-ounce (48 cans)	55, 986	183, 907
1-pound, 8-ounce (48 cans)	5, 324	22, 562
No. 2, 10-ounce (24 cans)	8, 998	28, 517
Other sizes (standard cases)	3, 196	13, 204
Chowder:		
No. 1, 10-ounce (48 cans)	16, 563	51, 542
Other sizes (standard cases)	30, 169	79, 772
Bouillon and juice:		
No. 1, 10-ounce (48 cans)	4, 867	14, 519
No. 2, 20-ounce (24 cans)	10, 077	21, 568
No. 10, 102-ounce (6 cans)	1, 851	2, 977
Other sizes (standard cases)	2, 137	5, 093
Total	139, 168	423, 661
Total (standard cases)	142, 871	
Grand total (standard cases)	434, 500	1, 766, 406

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[10] Includes a small amount of coquina broth packed in Florida.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 no. 1, 5-ounce cans to the case for whole and minced clams; and 48 no. 1, 10-ounce cans to the case for other clam products. Razor-clam products were canned at 10 plants in Washington, 4 in Oregon, and 14 in Alaska; hard-clam products, at 1 plant in Rhode Island, 2 in New York, 2 in New Jersey, 1 in Pennsylvania, 2 in Maryland, 1 in Florida, 6 in Washington, and 1 in Alaska; soft clam products, at 18 plants in Maine and 2 in Massachusetts; and coquina clam products, at 1 plant in Florida.

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PACK OF MISCELLANEOUS CANNED FISHERY PRODUCTS: STANDARD CASES

Item	Cases	Value	Item	Cases	Value
Mackerel	748, 567	$1,867,915	Salmon eggs (for bait)	3, 273	$93, 145
Shad	1, 148	3, 837	Miscellaneous fish, roe and caviar [13]	12, 110	85, 729
Shad roe	1, 108	24, 823	Crabs	9, 272	143, 517
Fish flakes [11]	20, 076	155, 424	Turtle and terrapin products	2, 607	42, 008
Cat and dog food	213, 811	588, 090	Miscellaneous shellfish [14]	18, 611	128, 829
Fish cakes, balls, etc	65, 100	441, 236			
Sturgeon caviar [12]	2, 596	333, 530			
Whitefish roe and caviar	854	29, 754	Total	1, 099, 133	3, 940, 837

[11] Tuna flakes are not included in this table, but are included in the table for canned tuna and tunalike fishes.

[12] Produced principally from imported sturgeon.

[13] Includes kippered and smoked salmon, finnan haddie, haddock, chowder, pickled eels, mackerel stew, smoked lingcod and sturgeon, anchovies, salmon roe and caviar, and miscellaneous roe.

[14] Includes oyster puree and soup, pickled mussels, sea cucumbers, squid, and conch products.

PRODUCTION OF OYSTER-SHELL PRODUCTS [15]

State	Crushed oyster-shell for poultry feed		Oyster-shell lime		Total	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
Rhode Island and Delaware	945	$7, 517	315	$1, 316	1, 260	$8, 833
New Jersey	4, 553	44, 864	1, 610	6, 629	6, 163	51, 493
Pennsylvania	3, 646	33, 119	1, 114	4, 570	4, 760	37, 689
Maryland	34, 298	175, 969	20, 993	30, 017	55, 296	205, 986
Virginia	15, 537	91, 940	[16] 14, 890	[16] 60, 543	30, 427	152, 483
North Carolina and South Carolina	7, 100	45, 300	[17] 1, 850	[17] 6, 287	8, 950	51, 587
Florida	65, 383	318, 715	([17])	([17])	65, 383	318, 715
Alabama, Louisiana, and Texas	113, 154	619, 173	1, 638	4, 014	114, 792	623, 187
Mississippi	14, 567	46, 992	2, 744	1, 408	17, 311	48, 400
Washington	2, 046	19, 467			2, 046	19, 467
California	16, 743	92, 682	3, 815	12, 688	20, 553	105, 370
Total	277, 972	1, 495, 738	48, 974	127, 472	326, 946	1, 623, 210

[15] Most of the production in Washington and a small part of the production in California was made from crushed clam shells.

[16] Of this amount 3,314 tons, valued at $22,948 were reported as "burned" lime.

[17] The production of oyster-shell lime in Florida has been included with that of North Carolina and South Carolina.

NOTE.—The above crushed shell products were prepared at 2 plants in Rhode Island, 9 in New Jersey, 5 in Pennsylvania, 1 in Delaware, 5 in Maryland, 10 in Virginia, 2 in North Carolina, 2 in South Carolina, 3 in Florida, 2 in Alabama, 5 in Mississippi, 1 in Louisiana, 1 in Texas, 5 in California, and 5 in Washington.

PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS

Item	Iowa		New York		Other States		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Pearl buttons..gross	13, 698, 445	$3, 139, 905	4, 346, 839	$959, 337	668, 724	$132, 794	18, 714, 008	$4, 232, 036
Crushed shell for poultry feed..tons	7, 575	59, 639			692	4, 006	8, 312	63, 645
Lime..do	2, 524	8, 274	294	466	245	180	3, 083	8, 920
Other products [18]		156, 210				32, 300		188, 510
Total		3, 364, 028		959, 803		169, 280		4, 493, 111

[18] Includes stucco, colored shells, and "pearl novelties."

NOTE.—Mussel shells utilized in the above production amounted to 60,292,000 pounds, valued at $873,138. Shells were taken in 16 States in the Mississippi Valley and Great Lakes region. The producing States in order of their importance were: Arkansas, which contributed 23 percent of the total quantity; Indiana, 16 percent; Tennessee, 14 percent; Illinois, 11 percent; Michigan, 9 percent; Kentucky, 6 percent; Iowa, 5 percent; Wisconsin, 5 percent; Minnesota, 3 percent; Alabama and Texas each 2 percent; Missouri, Ohio, and South Dakota, each 1 percent; and Mississippi and Oklahoma each less than one-half of 1 percent.

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PRODUCTION OF MARINE PEARL-SHELL PRODUCTS [19]

Item	Maine, Massachusetts, Rhode Island, and Connecticut		New York		New Jersey	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1, 199, 684	$741, 969	825, 708	$509, 920	1, 617, 128	$1, 073, 275
Novelties [20]		215, 400		46, 813		78, 955
Total		957, 369		556, 733		1, 152, 230

Item	Pennsylvania, Maryland, and Florida		Oregon and California		Total	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1, 843, 660	$974, 743			5, 486, 180	$3, 299, 907
Novelties [20]		101, 339		$20, 586		463, 093
Total		1, 076, 082		20, 586		3, 763, 000

[19] Produced principally from imported shells.

[20] Includes buckles, inlays for jewelry, knife handles, lamps, handles for manicure sets, ornaments, etc.

NOTE.—Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 1 in Rhode Island, 6 in Connecticut, 10 in New York, 21 in New Jersey, 3 in Pennsylvania, 1 in Maryland, 3 in Florida, 2 in Oregon, and 2 in California.

FISH UTILIZED AND PRODUCTS OF THE MENHADEN INDUSTRY

State	Menhaden utilized	Products						
		Dry scrap and meal		Acidulated scrap		Oil		Total
	Number	*Tons*	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
New Jersey, Delaware, Georgia and Florida	270, 860, 000	14, 304	$419, 675	5, 917	$116, 547	1, 554, 482	$196, 846	$733, 068
Virginia	192, 220, 000	13, 846	434, 647			1, 555, 995	231, 117	665, 764
North Carolina	70, 839, 000	3, 303	108, 290	3, 564	56, 733	233, 866	23, 007	188, 030
Total	[21] 533,919,000	[22] 31, 453	[22] 962, 612	9, 481	173, 280	3, 344, 343	450, 970	1, 586, 862

[21] 320,352,000 pounds.

[22] Of this production, 25,068 tons, valued at $767,878 were reported as dry scrap, and 6,385 tons, valued at $194,734, as fish meal.

NOTE.—The menhaden factories were located as follows: 2 in New Jersey, 2 in Delaware, 11 in Virginia, 9 in North Carolina, 1 in Georgia, and 5 in Florida.

PRODUCTION OF MISCELLANEOUS BYPRODUCTS

Product	Atlantic and Gulf coasts		Pacific coast (including Alaska)		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Dried scrap:						
Alewife ... tons	612	$15, 777			612	$15, 777
Crab, blue and king ... do	1, 106	25, 777			1, 106	25, 777
Miscellaneous [23] ... do	[24] 2, 474	[24] 50, 919	([24])	([24])	2, 474	50, 919
Acidulated and green scrap ... do	693	8, 007			693	8, 007
Meal:						
Herring (Alaska) ... do			11, 015	$349, 522	11, 015	349, 522
Herring (Maine) ... do	898	24, 601			898	24, 601
Pilchard ... do			50, 581	1, 530, 218	50, 581	1, 530, 218
Salmon ... do			1, 657	50, 477	1, 657	50, 477
Tuna ... do			6, 004	153, 300	6, 004	153, 300
Mackerel ... do			1, 278	35, 554	1, 278	35, 554
Ground fish "white fish" ... do	9, 083	402, 097			9, 083	402, 097
Blue crab ... do	800	11, 000			800	11, 000
Shrimp ... do	950	17, 655	229	6, 885	1, 179	24, 540
Miscellaneous [25] ... do	419	16, 940	1, 258	42, 675	1, 677	59, 615

[23] Includes ground fish, herring, and miscellaneous dried scrap.

[24] A quantity of miscellaneous dried scrap produced by two firms in California is included with the production of the Atlantic and Gulf coasts.

[25] Includes clam, king crab, salmon egg, whale meat and bone, and miscellaneous meal and fish flour.

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PRODUCTION OF MISCELLANEOUS BYPRODUCTS—Con.

Product	Atlantic and Gulf coasts		Pacific coast (including Alaska)		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Oil:						
Alewife..........gallons..	30,900	$3,518	....	....	30,900	$3,518
Cod and cod-liver:						
Medicinal..........do....	19,552	14,708	....	....	19,552	14,708
Industrial..........do....	45,331	22,152	....	....	45,331	22,152
Herring (Alaska)..........do....	....	....	3,104,821	$394.194	3,104,821	394,194
Herring (Maine)..........do....	69,391	7,963	....	....	69,391	7,963
Pilchard..........do....	....	....	10,263,776	1,593,088	10,263,776	1,593,088
Salmon..........do....	....	....	187,801	29,761	187,801	29,761
Mackerel..........do....	....	....	83,778	10,302	83,778	10,302
Whale:						
Sperm..........do....		....	16,200	2,900	16,200	2,900
Other..........do....	....	....	569,850	93,341	569,850	93,341
Miscellaneous [26]..........do....	[27] 6,479	[27] 1,622	(27)	(27)	6,479	1,622
Liquid glue..........do....	[28] 355,949	[28] 704,101	(28)	(28)	355,949	704,101
Miscellaneous byproducts [29]..........	....	93,405	....	279,713	....	373,118
Total..........	....	1,420,242	....	4,571,930	....	5,992,172

[26] Includes shark, shark-liver, and miscellaneous oil.

[27] A quantity of shark-liver oil produced by one firm in California is included with the production of miscellaneous oil of the Atlantic and Gulf States.

[28] A quantity of liquid glue produced by one firm in California is included with the production of liquid glue of the Atlantic and Gulf States.

[29] Includes pearl essence, fish scale novelties, shark skins and fins, isinglass, agar, and kelp products.

NOTE.—The oils produced on the Pacific coast are reported in trade gallons (7½ pounds) and those produced on the Atlantic and Gulf coasts are reported in United States gallons (about 7.74 pounds).

FROZEN FISH TRADE [3]

FISH FROZEN

During 1933 the output of freezing plants which reported their activities to the Government, amounted to 95,873,507 pounds of frozen fishery products. These products at the time they were held in cold storage plants were estimated to be valued at about $8,000,000. Compared with the pack in 1932 this was an increase of 4 percent. Six species or groups of fishery products comprised 68 percent of the pack. First in importance was the cod, haddock, haddock fillet, hake, and pollock group with 19 percent of the total, haddock fillets accounting for the bulk of the volume of this group. Next in importance was halibut, accounting for 14 percent of the total. Following was salmon with 12 percent of the total; mackerel, 11 percent; whiting, 8 percent; and shellfish, 4 percent. Other products frozen in considerable quantities during the year included sea herring, butterfish, cisco or lake herring, sablefish, smelts, weakfish or sea trout, and whitefish.

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[3] The statistics in this section have been furnished by the Bureau of Agricultural Economics, Department of Agriculture.

Production of frozen fishery products, 1933

BY SPECIES AND MONTHS

Species	Month ended the 15th of—						
	January	February	March	April	May	June	July
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	6, 987	8, 969	7, 106	3, 403	13, 881	25, 391	18, 997
Butterfish (all trade sizes)	3, 012	4, 648	3, 995	1, 012	89, 821	156, 826	106, 244
Catfish	40, 969	31, 344	14, 089	36, 676	75, 384	83, 059	50, 567
Cisco (Lake Erie)	9, 500	---------	---------	1, 329	336	8, 487	6, 218
Cisco (lake herring), including bluefin, blackfin, and chub	57, 258	28, 758	1, 710	11, 332	20, 605	118, 097	153, 667
Cisco (tullibees, Canadian lakes)	38, 451	70, 695	2, 268	17, 300	9, 925	20, 001	8, 453
Cod, haddock, hake, and pollock	159, 543	178, 839	143, 675	334, 516	375, 788	195, 921	497, 582
Croaker	5, 203	7, 355	3, 360	15, 425	156, 939	165, 396	186, 522
Flounders	20, 308	13, 475	2, 464	34, 385	131, 518	97, 721	46, 197
Haddock fillets	315, 534	299, 068	697, 544	1, 448, 434	1, 616, 094	1, 371, 660	1, 020, 309
Halibut (all trade sizes)	172, 842	214, 224	955, 911	377, 502	813, 457	1, 819, 825	2, 609, 855
Herring, sea (including alewives and bluebacks)	51, 826	17, 990	104, 656	268, 707	245, 166	238, 778	72, 961
Lake trout	9, 339	24, 070	5, 329	10, 573	30, 365	116, 365	24, 569
Mackerel (except Spanish)	60, 751	101, 913	69, 234	85, 765	130, 637	1, 860, 424	1, 096, 802
Pike, blue and sauger	20, 932	22, 095	345	---------	143, 909	101, 927	40, 965
Pike, yellow or wall-eyed	84, 858	15, 687	47, 990	10, 306	27, 224	19, 856	10, 901
Pike (including pickerel, jacks, and yellow jack)	14, 606	5, 453	7, 106	1, 029	7, 661	27, 580	8, 572
Sablefish (black cod)	17, 769	13, 719	18, 638	11, 245	69, 716	17, 762	36, 314
Salmon, chinook or king	2, 374	12, 995	15	2, 325	81, 659	22, 006	198, 695
Salmon, silver or coho	34, 547	34, 889	50, 008	33, 330	7, 155	906	45, 171
Salmon, fall and pink	43, 571	29, 748	9, 470	36, 895	23, 293	2, 670	9, 258
Salmon, steelhead trout	18, 754	460	2, 387	---------	7, 775	4, 963	72, 148
Salmon, red or sockeye	32, 009	63, 053	81, 342	14, 918	15, 621	53, 211	47, 988
Scup (porgies)	300	1, 198	267	---------	11, 570	157, 918	20, 439
Shad and shad roe	6, 085	10, 491	16, 691	13, 221	39, 823	56, 578	145, 826
Shellfish	348, 688	304, 169	168, 035	57, 970	172, 108	419, 557	274, 152
Smelts, eulachon, etc	257, 142	287, 573	157, 959	32, 837	18, 790	4, 176	4, 902
Squid	8, 461	7, 366	6, 028	---------	68, 658	416, 676	210, 460
Sturgeon and spoonbill cat	2, 390	3, 422	11, 996	14, 875	3, 059	26, 865	22, 020
Suckers	400	100	1, 935	100	10, 241	15, 378	10, 714
Weakfish (including southern "sea trout")	14, 947	59, 591	47, 712	9, 426	161, 204	95, 661	33, 003
Whitefish	34, 470	50, 120	43, 270	26, 477	16, 427	44, 698	152, 837
Whiting	58, 302	83, 560	76, 237	46, 730	38, 120	1, 870, 586	3, 215, 618
Miscellaneous fish	732, 671	744, 212	348, 090	647, 111	1, 029, 650	872, 624	773, 723
Total	2, 684, 804	2, 751, 249	3, 106, 862	3, 605, 154	5, 663, 579	10, 509, 549	11, 232, 649

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	185, 588	92, 209	206, 571	107, 768	13, 951	690, 821
Butterfish (all trade sizes)	35, 263	224, 446	780, 496	198, 362	7, 384	1, 611, 509
Catfish	24, 224	13, 808	14, 075	35, 004	64, 931	484, 130
Cisco (Lake Erie)	17, 470	28, 146	4, 755	4, 532	36, 046	116, 819
Cisco (lake herring), including bluefin, blackfin, and chub	171, 911	300, 448	71, 790	210, 922	789, 010	1, 935, 508
Cisco (tullibees, Canadian lakes)	14, 503	10, 384	5, 030	10, 000	35, 922	242, 932
Cod, haddock, hake, and pollock	818, 695	356, 580	348, 738	556, 269	662, 744	4, 628, 890
Croaker	169, 974	54, 141	20, 083	126, 872	52, 895	964, 170
Flounders	77, 983	26, 748	38, 866	58, 569	91, 759	639, 993
Haddock fillets	1, 857, 486	1, 637, 281	1, 831, 203	1, 124, 859	714, 688	13, 934, 160
Halibut (all trade sizes)	2, 809, 652	1, 541, 819	962, 976	1, 165, 043	438, 231	13, 881, 337
Herring, sea (including alewives and bluebacks)	255, 598	664, 433	432, 588	600, 895	414, 520	3, 368, 118
Lake trout	30, 358	23, 098	89, 038	315, 381	146, 550	825, 035
Mackerel (except Spanish)	3, 164, 049	2, 314, 254	1, 146, 051	391, 168	113, 288	10, 534, 336
Pike, blue and sauger	2, 681	7, 514	29, 197	110, 695	283, 561	763, 821
Pike, yellow or wall-eyed	15, 496	30, 142	78, 399	28, 522	8, 280	377, 661
Pike (including pickerel, jacks, and yellow jack)	32, 394	35, 658	16, 872	25, 438	7, 114	189, 483
Sablefish (black cod)	104, 557	178, 351	325, 536	238, 488	40, 978	1, 073, 073
Salmon, chinook or king	912, 615	632, 703	394, 187	75, 682	70, 657	2, 405, 913
Salmon, silver or coho	1, 399, 692	1, 688, 842	1, 696, 295	1, 354, 783	42, 371	6, 387, 989
Salmon, fall and pink	59, 399	98, 166	153, 020	991, 473	67, 482	1, 524, 445
Salmon, steelhead trout	318, 598	40, 855	30, 195	15, 820	50, 276	562, 231
Salmon, red or sockeye	77, 441	141, 015	180, 149	43, 567	96, 039	846, 353
Scup (porgies)	2, 561	53, 184	3, 870	2, 350	200	253, 857
Shad and shad roe	91, 142	83, 171	2, 474	12, 592	3, 899	481, 993
Shellfish	215, 224	435, 134	497, 062	608, 967	716, 180	4, 217, 246

Production of frozen fishery products, 1933—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Smelts, eulachon, etc	28, 412	25, 794	26, 573	56, 988	174, 451	1, 075, 597
Squid	57, 026	43, 084	17, 143	37, 259	122	872, 283
Sturgeon and spoonbill cat	41, 869	23, 213	39, 159	13, 102	5, 122	207, 092
Suckers	740	691	1, 966	6, 564	2, 195	51, 024
Weakfish (including southern "sea trout")	22, 068	80, 443	225, 630	388, 402	64, 190	1, 202, 277
Whitefish	345, 604	251, 224	220, 730	50, 695	72, 314	1, 308, 866
Whiting	1, 171, 751	258, 186	170, 947	136, 046	159, 495	7, 285, 578
Miscellaneous fish	1, 018, 282	1, 234, 096	927, 208	1, 321, 189	1, 280, 111	10, 928, 967
Total	15, 550, 306	12, 629, 261	10, 988, 872	10, 424, 266	6, 726, 956	95, 873, 507

BY GEOGRAPHICAL SECTIONS AND SPECIES[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Bluefish (all trade sizes)	40	584	3	38	3	23		691
Butterfish (all trade sizes)	135	1, 435	17	25				1, 612
Catfish	94		67	72	207	44		484
Cisco (Lake Erie)		114		3				117
Cisco (lake herring), including bluefin, blackfin, and chub		695		966	275			1, 936
Cisco (tullibees, Canadian lakes)	40	159		30	14			243
Cod, haddock, hake, and pollock	4, 178	116	1	55	180		99	4, 629
Croaker		245	572	143		4		964
Flounders	273	335		14		3	15	640
Haddock fillets	13, 099	138	14	565	81		37	13, 934
Halibut (all trade sizes)	114	557	53	904	30	25	12, 198	13, 881
Herring, sea (including alewives and bluebacks)	2, 128	207	6	406	1	5	615	3, 368
Lake trout	2	144		565	106	8		825
Mackerel (except Spanish)	9, 034	1, 121	3	263	20	28	66	10, 535
Pike, blue and sauger		490		272	1	1		764
Pike, yellow or wall-eyed		157		128	93			378
Pike (including pickerel, jacks, and yellow jack)		17		67	105			189
Sablefish (black cod)				123	13		937	1, 073
Salmon, king or chinook	56	57		40	9		2, 244	2, 406
Salmon, silver or coho	20	219	2	19	4		6, 124	6, 388
Salmon, fall and pink	6	27		19	3		1, 469	1, 524
Salmon, steelhead trout		36	9				517	562
Salmon, sockeye or red		206		122	23	3	492	846
Scup (porgies)	85	166	3					254
Shad and shad roe	321	77		37	2	2	43	482
Shellfish	505	1, 785	809	559	217	7	335	4, 217
Smelts, eulachon, etc	47	874	1	35	3		116	1, 076
Squid	510	350		3			9	872
Sturgeon and spoonbill cat		137	2	8	21	27	12	207
Suckers				50	1			51
Weakfish (including southern "sea trout")	1	916	285					1, 202
Whitefish	5	930		363	8	2	1	1, 309
Whiting	6, 472	591	2	11	210			7, 286
Miscellaneous fish	2, 439	1, 373	1, 207	2, 202	518	1, 619	1, 571	10, 929
Total	39, 604	14, 258	3, 056	8, 107	2, 148	1, 801	26, 900	95, 874

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[1] New England includes the six States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

Production of frozen fishery products, 1933—Continued

BY GEOGRAPHICAL SECTIONS AND MONTHS

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
January	475	878	294	519	95	139	285	2,685
February	411	1,007	373	426	70	165	299	2,751
March	768	674	90	252	126	132	1,065	3,107
April	1,809	246	211	214	149	96	880	3,605
May	2,367	734	345	685	130	223	1,180	5,664
June	5,606	1,499	178	1,080	135	112	1,900	10,510
July	6,294	842	266	592	173	122	2,944	11,233
August	7,640	1,205	261	522	187	167	5,568	15,550
September	5,920	1,491	55	528	166	203	4,266	12,629
October	3,733	2,455	81	530	262	148	3,780	10,989
November	2,736	1,631	193	1,309	336	138	4,081	10,424
December	1,845	1,596	709	1,450	319	156	652	6,727
Total	39,604	14,258	3,056	8,107	2,148	1,801	26,900	95,874

HOLDINGS

During 1933 monthly holdings of frozen fish and shellfish averaged 39,386,000 pounds, which is a decrease of 17 percent as compared with the average monthly holdings in 1932. The holdings during November were largest, amounting to 58,338,000 pounds; however, the holdings during each of the months from September to December inclusive exceeded 50,000,000 pounds. The holdings during April were smallest when only 19,335,000 pounds of frozen fishery products were in storage.

Holdings of frozen fishery products, 1933

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	559,958	435,422	347,239	269,480	248,983	242,194
Butterfish (all trade sizes)	338,783	212,110	104,304	52,327	114,287	238,344
Catfish	298,454	310,491	184,515	115,312	116,312	205,495
Cisco (Lake Erie)	185,365	226,019	169,994	109,912	70,406	35,578
Cisco (lake herring), including bluefin, blackfin, and chub	642,936	383,448	120,022	50,850	97,241	405,164
Cisco (tullibees, Canadian lakes)	519,842	574,534	399,555	369,894	365,597	293,063
Cod, haddock, hake, and pollock	711,656	572,020	307,200	378,341	640,836	701,109
Croaker	677,052	465,963	200,309	99,023	193,385	295,893
Flounders	213,749	167,560	91,124	92,739	184,057	191,793
Haddock fillets	2,119,521	1,440,810	868,494	1,492,497	2,549,574	2,892,345
Halibut (all trade sizes)	2,817,401	1,785,179	1,531,530	1,458,041	1,877,057	3,534,446
Herring, sea (including alewives and bluebacks)	1,573,849	1,216,964	1,009,421	963,286	1,049,428	955,260
Lake trout	591,939	440,842	194,651	67,641	89,183	194,227
Mackerel (except Spanish)	10,328,815	7,914,864	5,617,720	4,131,263	3,326,512	4,522,169
Pike, blue and sauger	326,299	186,901	90,121	24,889	149,893	246,037
Pike, yellow or wall-eyed	283,738	510,054	412,613	173,974	169,628	95,776
Pike (including pickerel, jacks, and yellow jack)	241,928	223,587	233,229	149,677	142,447	157,669
Sablefish (black cod)	698,155	564,961	454,893	337,914	298,243	245,779
Salmon, chinook or king	1,634,798	1,392,399	951,432	517,196	263,207	190,445
Salmon, silver or coho	3,639,900	2,350,043	1,151,225	564,037	261,091	217,684
Salmon, fall and pink	913,521	601,835	467,685	405,231	398,988	256,894
Salmon, steelhead trout	402,223	352,581	176,530	149,293	119,810	112,491
Salmon, red or sockeye	650,882	580,203	551,203	250,383	174,003	123,236
Scup (porgy)	176,846	125,328	63,661	14,318	15,195	168,943
Shad and shad roe	224,448	187,738	139,641	89,706	107,706	126,789
Shellfish	1,911,491	1,347,992	1,387,739	939,533	832,412	1,043,363
Smelts, eulachon, etc	344,100	797,367	1,001,143	637,436	570,138	514,727
Squid	1,568,225	1,358,679	949,980	555,421	481,787	732,305
Sturgeon and spoonbill cat	1,015,871	944,398	844,254	687,991	604,613	550,370
Suckers	13,000	12,305	8,902	3,748	12,404	27,410
Weakfish (including southern "sea trout")	378,693	351,864	208,129	82,760	213,998	285,282
Whitefish	1,312,443	1,119,443	1,151,730	623,737	457,872	312,506
Whiting	2,919,007	1,987,544	1,285,482	583,907	325,040	2,123,489
Miscellaneous fish	5,241,234	4,327,068	3,179,268	2,893,112	3,123,304	3,473,048
Total	45,476,122	35,468,516	25,854,938	19,334,869	19,644,637	25,711,323

Holdings of frozen fishery products, 1933—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	200, 182	403, 013	397, 554	530, 399	569, 529	463, 416
Butterfish (all trade sizes)	304, 718	305, 680	493, 657	1, 058, 770	1, 166, 206	996, 213
Catfish	247, 078	220, 992	188, 331	169, 853	158, 586	218, 372
Cisco (Lake Erie)	43, 676	54, 903	80, 299	80, 902	70, 921	96, 969
Cisco (lake herring), including bluefin, blackfin, and chub	608, 124	895, 361	1, 119, 058	1, 202, 198	1, 282, 964	1, 931, 787
Cisco (tullibees, Canadian lakes)	280, 144	282, 035	223, 554	225, 608	169, 036	303, 956
Cod, haddock, hake, and pollock	1, 117, 222	1, 688, 080	1, 531, 236	1, 212, 754	1, 429, 789	1, 843, 168
Croaker	457, 792	568, 898	548, 210	520, 290	511, 073	522, 778
Flounders	188, 961	244, 312	219, 006	196, 141	223, 986	265, 347
Haddock fillets	3, 039, 853	4, 255, 986	4, 575, 522	5, 590, 470	5, 349, 530	4, 980, 536
Halibut (all trade sizes)	5, 875, 009	8, 372, 420	9, 507, 466	9, 767, 880	9, 243, 309	7, 792, 242
Herring, sea (including alewives and bluebacks)	796, 715	845, 985	1, 263, 856	1, 435, 579	2, 023, 058	2, 016, 529
Lake trout	180, 340	175, 023	174, 598	269, 536	566, 689	702, 037
Mackerel (except Spanish)	5, 044, 686	7, 635, 663	8, 839, 982	9, 015, 455	7, 864, 802	6, 928, 127
Pike, blue and sauger	171, 917	29, 832	27, 786	131, 874	360, 420	754, 228
Pike, yellow or wall-eyed	94, 201	74, 079	111, 727	168, 761	131, 178	189, 019
Pike (including pickerel, jacks, and yellow jack)	121, 832	130, 037	156, 886	153, 858	152, 016	174, 791
Sablefish, (black cod)	264, 425	315, 866	392, 060	614, 749	786, 817	744, 063
Salmon, chinook or king	305, 232	1, 088, 979	1, 630, 962	1, 886, 125	1, 937, 629	1, 686, 661
Salmon, silver or coho	251, 069	1, 352, 722	2, 807, 859	4, 175, 741	5, 302, 877	3, 508, 861
Salmon, fall and pink	221, 546	247, 461	320, 926	385, 047	1, 192, 622	2, 326, 835
Salmon, steelhead trout	157, 676	315, 006	387, 643	277, 532	234, 291	282, 063
Salmon, red or sockeye	105, 838	121, 427	219, 554	365, 603	346, 922	354, 713
Scup (porgy)	181, 446	180, 164	224, 978	225, 293	206, 503	159, 240
Shad and shad roe	264, 253	337, 660	415, 015	379, 399	366, 933	389, 991
Shellfish	981, 724	895, 579	1, 055, 641	1, 264, 341	1, 699, 591	2, 024, 535
Smelts, eulachon, etc	500, 734	517, 146	526, 927	518, 594	437, 173	430, 666
Squid	828, 188	731, 668	633, 377	537, 180	500, 149	363, 533
Sturgeon and spoonbill cat	460, 495	357, 055	276, 883	261, 119	272, 584	405, 263
Suckers	36, 245	35, 390	32, 430	32, 094	21, 414	29, 978
Weakfish (including southern "sea trout")	272, 347	279, 232	328, 761	531, 953	782, 728	668, 234
Whitefish	1, 229, 976	2, 180, 867	2, 525, 231	2, 502, 796	2, 511, 392	2, 729, 242
Whiting	5, 020, 126	5, 652, 475	5, 534, 893	5, 283, 745	4, 977, 054	4, 799, 664
Miscellaneous fish	3, 477, 144	4, 091, 137	4, 703, 111	4, 956, 142	5, 488, 579	6, 105, 432
Total	33, 330, 914	44, 882, 133	51, 474, 979	55, 927, 781	58, 338, 350	57, 188, 489

BY GEOGRAPHICAL SECTIONS AND MONTHS[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific[2]	Total
January	16, 120	9, 937	2, 781	4, 760	2, 402	524	8, 952	45, 476
February	12, 271	8, 843	2, 045	3, 825	2, 246	456	5, 783	35, 469
March	8, 348	6, 877	1, 298	2, 370	1, 857	340	4, 765	25, 855
April	6, 173	4, 847	1, 048	1, 610	1, 441	284	3, 932	19, 335
May	6, 130	4, 462	1, 066	2, 277	1, 493	396	3, 821	19, 645
June	9, 916	4, 988	1, 060	2, 863	1, 592	330	4, 962	25, 711
July	14, 474	5, 811	1, 231	2, 604	1, 435	268	7, 508	33, 331
August	20, 071	7, 084	1, 427	2, 608	1, 408	329	11, 955	44, 882
September	22, 598	7, 572	1, 257	2, 717	1, 587	404	15, 340	51, 475
October	23, 015	9, 378	1, 306	2, 972	1, 708	397	17, 152	55, 928
November	21, 389	10, 436	1, 361	4, 119	2, 083	427	18, 523	58, 338
December	19, 342	11, 988	1, 980	5, 622	2, 383	485	15, 388	57, 188
Average	14, 987	7, 685	1, 488	3, 196	1, 803	387	9, 840	39, 386

[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

[2] Includes a very small amount of fish held in Colorado in the Mountain section.

COLD-STORAGE HOLDINGS OF CURED FISH

During 1933 monthly cold-storage holdings of cured herring and mild-cured salmon averaged 14,907,000 pounds, which is a decrease of 18 percent as compared with the average monthly holdings in 1932. The holdings during October were largest, amounting to 21,924,000 pounds, and the smallest were in April, amounting to 9,191,000 pounds.

Holdings of cured fish, 1933: By species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	Pounds	*Pounds*	*Pounds*
January	12, 136, 374	3, 933, 005	16, 069, 379
February	11, 137, 364	3, 544, 376	14, 681, 740
March	9, 623, 504	2, 400, 345	12, 023, 849
April	7, 621, 553	1, 569, 788	9, 191, 341
May	8, 652, 589	2, 266, 722	10, 919, 311
June	9, 211, 715	1, 402, 142	10, 613, 857
July	9, 062, 692	1, 696, 780	10, 759, 472
August	9, 236, 158	5, 169, 901	14, 406, 059
September	12, 324, 553	6, 631, 918	18, 956, 471
October	15, 710, 119	6, 214, 266	21, 924, 385
November	15, 214, 185	5, 928, 630	21, 142, 815
December	13, 620, 771	4, 576, 118	18, 196, 889

FOREIGN FISHERY TRADE

The foreign trade in fishery products of the United States in 1933 amounted to $38,801,064 of which $30,462,341 represents the value of these products imported for consumption, and $8,338,723, the value of exports of domestic fishery products. Compared with the previous year, there was an increase of 4 percent in the total trade, 3 percent in the value of the imports, and 7 percent in the value of exports.

Imports consisted of 284,306,782 pounds of edible products, valued at $21,782,874, and nonedible products, valued at $8,679,467. Fishery exports consisted of 80,007,878 pounds of edible products, valued at $7,376,401 and nonedible products, valued at $962,322.

Exports of domestic fishery products, 1933

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh, frozen, or packed in ice:		
Salmon pounds	5, 754, 305	$545, 946
Other do	2, 744, 270	207, 106
Total do	8, 498, 575	753, 052
Fish, salted, smoked, or dry-cured:		
Cod do	647, 419	58, 472
Salmon do	779, 232	108, 456
Other do	989, 921	46, 513
Total do	2, 416, 572	213, 441
Fish, pickled:		
Salmon do	1, 941, 800	268, 296
Other do	1, 088, 000	43, 434
Total do	3, 029, 800	311, 730

Exports of domestic fishery products, 1933—Continued

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, canned:		
Mackerel, pounds	1,968,982	$93,071
Salmon, do.	26,539,379	3,289,924
Sardines, do.	25,641,265	1,386,680
Other, do.	320,132	47,316
Total, do.	54,469,758	4,816,991
Shellfish, not canned:		
Oysters, fresh, in the shell, do.	2,901,860	97,134
Oysters, fresh, shucked, frozen, or in ice, do.	1,265,060	151,785
Shrimp, fresh, frozen, or in ice, do.	1,852,664	176,859
Shrimp, dried, do.	1,646,888	265,561
Other shellfish, fresh, frozen, in ice or dried, do.	129,108	13,833
Total, do.	7,795,580	705,172
Shellfish, canned, do.	3,481,792	512,632
Other fish products, do.	315,801	63,383
Total edible products, do.	80,007,878	7,376,401
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils, do.	5,849,288	163,138
Sponges, do.	72,101	67,727
Fish meal for feed, tons	7,918	346,133
Oyster shells, do.	57,000	385,324
Total nonedible products		962,322
Grand total		8,338,723

Imports of fishery products entered for consumption, 1933

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh or frozen:		
Whole, beheaded, or eviscerated, or both:		
Salmon	5,083,345	$384,786
Fresh-water fish, not elsewhere specified:		
Yellow pike	8,498,767	589,015
Whitefish	10,029,807	871,847
Tullibees	1,535,130	46,425
Jacks or grass pike	1,825,550	86,837
Lake trout	1,766,268	167,389
Yellow perch	1,077,969	71,347
Lake herring, ciscoes, and chubs	992,572	101,657
Fresh-water fish, not elsewhere specified	14,434,347	859,508
Eels	237,735	19,626
Cod, haddock, hake, pollock, and cusk	593,186	26,769
Halibut:		
Fresh	3,015,619	230,834
Frozen	1,070,753	89,367
Mackerel	507,816	22,719
Swordfish	2,633,935	232,349
Sturgeon	1,960,794	222,685
Fish, not specially provided for	2,154,022	103,205
Whether or not whole:		
Smelts	6,726,196	672,068
Tuna fish	5,935,957	232,987
Sea herring:		
Fresh	23,899,000	95,197
Frozen	1,963,474	52,535
Fillets, skinned, boned, sliced, or divided, not specially provided for	2,504,541	261,523
Total	98,446,783	5,440,675
Fish, salted, dried, smoked, pickled or preserved:		
Dried and unsalted:		
Cod, haddock, hake, pollock, and cusk	27,721	2,812
Other	3,150,758	295,311
In oil or in oil and other substances:		
Sardines	33,555,513	2,811,197
Anchovies	1,724,766	455,718
Antipasto	158,866	56,587
Tuna	14,382,256	1,969,144
Other	136,416	20,027

Imports of fishery products entered for consumption, 1933—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, salted, dried, smoked, pickled or preserved—Continued.		
Not in oil or in oil and other substances:		
In air-tight containers weighing with contents, not over 15 pounds each:		
Anchovies	2,025,739	$170,845
Salmon	4,815,768	227,312
Herring and sardines	7,699,857	446,378
Fish cakes, balls, and pudding	1,746,804	91,103
Other	1,538,446	133,499
Pickled or salted:		
Not in oil, etc., and not in air-tight containers weighing, with contents, 15 pounds or less each:		
Salmon	317,900	31,777
Cod, haddock, hake, pollock, and cusk, neither skinned nor boned (except that vertebral column may be removed):		
Containing not more than 43 percent moisture by weight	12,164,979	564,847
Containing more than 43 percent moisture by weight	26,476,539	833,671
Cod, haddock, hake, pollock and cusk, skinned or boned	2,027,855	139,522
Herring:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	29,326,957	1,335,125
In containers (not air-tight), weighing, with contents, not more than 15 pounds each	133,638	4,704
Mackerel:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	4,403,451	176,341
Pickled or salted, not specially provided for:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	1,294,831	74,184
In containers (not air-tight) weighing, with contents, not more than 15 pounds each	8,750	881
Smoked or kippered:		
Not in oil, etc., and not in air-tight containers weighing, with contents, 15 pounds or less each:		
Salmon	2,270	1,109
Herring:		
Whole or beheaded	638,607	27,044
Eviscerated, split, skinned, boned, or divided	871,021	73,631
Cod, haddock, hake, pollock, and cusk:		
Whole, or beheaded, or eviscerated, or both	686,551	54,108
Filleted, skinned, boned, sliced, or divided	885,815	80,003
Smoked or kippered, not specially provided for	16,025	1,159
Fish paste and fish sauce	74,281	24,142
Prepared or preserved, not specially provided for:		
In containers weighing, with contents, not more than 15 pounds each	57,504	6,529
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	148,464	14,231
Total	150,498,348	10,122,941
Caviar and other fish roe:		
Not boiled, etc.:		
Sturgeon	263,147	248,657
Fish roe, not specially provided for	99,195	11,320
Boiled, packed in air-tight containers	49,227	3,774
Total	411,569	263,751
Shellfish:		
Crab meat, crab sauce, and crab paste	9,526,113	2,893,435
Clams, clam juice, or either in combination with other substances, in air-tight containers	1,417,315	131,856
Oysters, oyster juice, or either in combination with other substances in airtight containers	97,381	19,659
Lobsters (including spiny lobsters and crawfish):		
Not canned	10,622,543	1,733,988
Canned	1,468,796	485,038
Clams not in airtight containers	1,368,207	21,313
Shrimp and prawn	716,235	84,989
Scallops	834,556	114,695
Oysters, not in airtight containers	4,905,457	118,337
Shellfish, not specially provided for	3,622,816	326,087
Pastes and sauces of shellfish, not specially provided for	124,524	12,077
Crabs	11,380	920
Turtles	234,759	13,113
Total	34,950,082	5,955,507
Total edible fishery products	284,306,782	21,782,874

Imports of fishery products entered for consumption, 1933—Continued

Item	Pounds	Value
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils:	*Quantity*	
Cod oil ... gallons	2,115,144	$449,695
Cod-liver oil ... do	3,432,569	1,711,072
Eulachon oil ... do	760	326
Herring oil ... do	699,296	42,431
Menhaden oil ... do	1,493	119
Seal oil ... do	106,048	22,939
Sod oil ... do	78,652	11,131
Whale oil:		
Sperm, crude ... do	520,212	119,527
Sperm, refined or otherwise processed ... do	106,308	38,238
Whale oil, not specially provided for ... do	5,735,613	2,398,728
Total ... do	12,796,095	4,794,206
Pearls and imitation pearls:		
Pearls and parts, not strung or set		681,083
Imitation pearls:		
Half pearls and hollow or filled		4,509
Solid pearls, not elsewhere specified:		
Valued at not more than one-fourth cent an inch ... inches	14,880	10
Valued at more than one-fourth cent and not more than 1 cent an inch ... inches	54,707	355
Iridescent solid pearls:		
Valued at not more than 10 cents per inch ... do	3,065	79
Total		686,036
Shells and buttons of pearl or shell:		
Shells, unmanufactured:		
Green snail shell ... pounds	205,538	16,110
Mother-of-pearl ... do	4,905,025	1,131,197
Shells, not specially provided for ... do	4,392,206	39,375
Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured		50,078
Shell pearl buttons:		
Ocean or trochus ... gross	236,829	66,566
Fresh-water ... do	100	40
Buttons (from Philippine Islands) ... do	749,469	249,170
Total		1,552,536
Sponges:		
Sheepswool ... pounds	133,477	202,083
Yellow, grass, or velvet ... do	231,621	79,389
Other ... do	82,786	69,636
Manufactures of ... do	96	28
Total ... do	447,980	351,136
Agar agar ... do	629,784	165,627
Ambergris ... do	8	763
Cod-liver oil cake and cod-liver oil cake meal ... do	1,614,598	24,744
Cuttlefish bone ... do	295,182	35,091
Goldfish, live ... number	1,125,012	7,103
Fish for other than human consumption, not elsewhere specified		189,836
Fish sounds ... pounds	98,046	14,223
Fish scrap and fish meal ... tons	26,526	689,192
Kelp ... pounds	38,550	561
Leather, seal ... square feet	26	11
Skins, fish, raw or salted ... pounds	884,412	31,804
Skins, seal, raw (not fur skins) ... do	1,416,355	125,608
Spermaceti wax ... do	100,843	10,334
Whalebone, unmanufactured ... do	503	92
Whalebone, manufactures of		564
Total		1,295,553
Total, nonedible fishery products		8,679,467
Grand total		30,462,341

FISHERIES OF THE NEW ENGLAND STATES

(Area XXII) [4]

The yield of the commercial fisheries of the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1933, amounted to 499,936,139 pounds, valued at $13,485,550 to the fishermen, representing an increase of 4 percent in volume, but a decrease of 4 percent in value as compared with the catch in the previous year. These fisheries gave employment to 17,073 fishermen as compared with 16,472, in 1932.

There were 362 fishery wholesale and manufacturing establishments in the 5 States in 1933 as compared with 436 in 1931 when the most recent previous survey of such concerns was made. In 1933 these establishments employed 9,177 persons, paid $5,410,072 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at $14,322,274. In 1931, the wholesale and manufacturing firms employed 10,273 persons, paid $7,113,463 in salaries and wages, and produced manufactured products, valued at $18,616,951.

Fisheries of the New England States, 1933

SUMMARY OF CATCH

Product	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	83,071,766	$848,662	306,475	$8,841	359,144,370	$8,196,646	11,648,054	$282,642	7,450,301	$255,662	461,620,966	$9,592,453
Shellfish, etc	15,426,316	1,458,445	216,929	48,230	14,525,908	1,310,332	5,718,293	718,622	2,427,727	357,468	38,315,173	3,893,097
Total	98,498,082	2,307,107	523,404	57,071	373,670,278	9,506,978	17,366,347	1,001,264	9,878,028	613,130	499,936,139	13,485,550

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[4] This is the number given this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft whose principal fishing ports are in the area but at times fish elsewhere. Notable examples are the ground fish fishery in area XXI and the mackerel and southern trawl fisheries in areas XXIII and XXIV. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the New England States, 1933—Continued

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	443		3,971	328	307	5,049
On boats and shore:						
Regular	3,748	48	2,781	371	360	7,308
Casual	1,841	52	1,652	677	494	4,716
Total	6,032	100	8,404	1,376	1,161	17,073
Vessels:						
Steam			13	8	3	24
Net tonnage			2,097	201	581	2,879
Motor	73		365	65	67	570
Net tonnage	856		13,995	695	1,056	16,602
Sail	1					1
Net tonnage	47					47
Total vessels	74		378	73	70	595
Total net tonnage	903		16,092	896	1,637	19,528
Boats:						
Motor	2,342	34	1,478	433	294	4,581
Other	1,396	17	1,624	506	276	3,819
Accessory boats	172		942	74	39	1,227
Apparatus:						
Purse seines:						
Mackerel	25		97	2		124
Length, yards	6,648		45,720	420		52,788
Other	51		2	1		54
Length, yards	7,040		260	400		7,700
Haul seines	31	1	15	20	12	79
Length, yards	3,100	35	1,655	2,512	1,668	8,970
Gill nets:						
Anchor	1,736	4	704		2	2,446
Square yards	556,491	2,160	280,655		1,680	840,986
Drift	709		4,105	44	43	4,901
Square yards	230,396		1,530,960	17,800	12,360	1,791,516
Runaround			1			1
Square yards			1,800			1,800
Lines:						
Hand	5,089	116	505	248	405	6,363
Hooks	5,259	116	671	319	443	6,808
Trawl	24,134	260	47,836	51	800	73,081
Hooks	1,155,574	13,000	2,380,062	24,700	35,680	3,609,016
Troll			8	48		56
Hooks			8	48		56
Trot with hooks	16			1		17
Hooks	1,600			200		1,800
Pound nets	3		86	64	9	162
Floating traps	21		17	40		78
Weirs	213		4			217
Fyke nets	56		24	37	4	121
Dip nets	124		130		119	373
Bag nets	112	30				142
Push nets			50			50
Pocket nets	2					2
Otter trawls	50		366	61	89	566
Yards at mouth	1,235		21,084	1,635	2,373	26,327
Box traps	13		3			16
Pots:						
Crab	2,296		1,095			3,391
Eel	222		1,565	1,698	1,289	4,774
Lobster	180,439	2,990	65,147	53,672	17,212	319,460
Periwinkle and cockle			935	1,585		2,520
Harpoons	43		126	36	16	221
Spears	26		185	13	42	266
Dredges:						
Oyster			34	30	43	107
Yards at mouth			44	45	65	154
Scallop	155		2,038	374	2	2,569
Yards at mouth	231		1,895	324	7	2,457
Clam			63	12		75
Yards at mouth			31	9		40
Mussel				1		1
Yards at mouth				1		1
Tongs			166	543	118	827
Rakes			654	75	71	800
Forks			945	8		953
Hoes	1,605		260	26	38	1,929

Fisheries of the New England States, 1933—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,703,078	$6,371			923,056	$8,399	176,000	$1,915	15,162	$152	2,817,296	$16,837
Amberjack					2,275	68					2,275	68
Bluefish	85	11			430,040	42,882	194,386	10,806	296,454	22,058	920,965	75,757
Bonito					5,222	233	46,322	1,923			51,544	2,156
Butterfish	99,475	5,059			951,585	45,905	486,522	16,204	15,941	764	1,553,523	67,932
Cod	9,336,894	145,484	28,602	$858	89,210,361	1,688,460	908,241	16,735	147,925	4,457	99,632,023	1,855,994
Crevalle							2,200	81			2,200	81
Croaker					2,491,145	35,716			5,738	136	2,496,883	35,852
Cunners	175	5			152	2	41,440	451			41,767	458
Cusk	1,583,366	18,342	17,161	343	4,509,004	53,766					6,109,531	72,451
Drum:												
Black					32	1			100	1	132	2
Red					1,755	32					1,755	32
Eels:												
Common	102,025	8,028			222,279	10,727	145,611	12,113	47,394	3,964	517,309	34,832
Conger					38,617	733	958	29	1,400	120	40,975	882
Flounders	1,178,669	27,517			27,187,427	878,601	3,253,077	90,930	6,176,038	175,968	37,795,211	1,173,016
Frigate mackerel					68,799	2,752	56,654	1,609			125,453	4,361
Grayfish	316	7			12,512	132	600	12			13,428	151
Haddock	9,306,555	215,744	60,063	2,703	150,680,476	3,425,852	23,968	703	35,450	1,018	160,106,512	3,646,020
Hake	7,084,013	66,270	168,749	2,531	8,056,678	133,691	9,171	183	1,081	20	15,319,692	202,695
Halibut	50,011	4,776			2,401,292	230,469			6,063	310	2,457,366	235,555
Herring, sea	43,774,988	160,816	2,000	20	3,572,960	38,784	737,006	11,467			48,086,954	211,087
Herring smelt					11,648	313					11,648	313
Hickory shad							2,308	23			2,308	23
King whiting or "kingfish"					38,296	1,035	1,440	53	451	12	40,187	1,100
Launce					21,000	420					21,000	420
Mackerel	4,499,107	57,740	1,050	53	35,611,363	798,108	719,289	22,137	870	27	40,831,679	878,065
Menhaden					334	4	1,003,510	2,535	25,250	252	1,029,094	2,791
Mullet					10	1	8,811	321			8,821	322
Pigfish					3,832	73					3,832	73
Pollock	3,006,065	23,414	11,441	114	11,991,798	140,076	17,242	451			15,026,546	164,055
Rosefish	2,063	14			262,255	2,827					264,318	2,841
Salmon	24,644	6,269			45	9					24,689	6,278
Scup or porgy					2,133,410	50,068	2,019,431	37,433	41,987	1,659	4,194,828	89,160
Sea bass					3,923,089	117,321	48,265	2,543	27,615	1,843	3,998,969	121,707
Sea robin					400	8	73,785	697	3,250	33	77,435	738
Shad	178,901	1,834			62,751	1,986	10,760	1,138	133,280	10,969	385,692	15,927

Sharks	29,923	230			34,148	287	1,947	28			66,018	545
Sheepshead					9	1					9	1
Skates	7,981	115			37,256	479	176,410	1,328	18,550	185	240,197	2,107
Skipper or "billfish"					4,110	41	730	14			4,840	55
Smelt	529,990	56,827	14,267	2,140			4,250	425	2,240	224	550,747	59,616
Spot					32,743	376	45	1	50	1	32,838	378
Squeteagues or "sea trout":												
Gray					286,547	8,543	63,310	4,012	19,510	1,736	369,367	14,291
Spotted					2,048	204					2,048	204
Striped bass					19,957	3,932	39,232	2,418	2,250	225	61,439	6,575
Sturgeon	2,308	224			5,130	639	449	37	44	5	7,931	905
Suckers	50,518	1,502							1,000	60	51,518	1,562
Swordfish	323,939	39,381			2,643,512	324,817	259,710	23,799	151,235	16,650	3,381,396	404,647
Tautog					173,543	6,766	267,123	7,402	43,098	1,895	483,764	16,063
Thimble-eyed mackerel							77,707	1,533			77,707	1,533
Tilefish									207,000	10,330	207,000	10,330
Tomcod	1,964	51					200	1			2,164	52
Tuna or "horse mackerel"	100,532	2,069			256,372	14,016	44,577	1,484			401,481	17,569
White perch					48,786	7,109	861	42			49,647	7,151
Whiting					8,677,742	88,648	724,506	7,626	16,775	547	9,419,023	96,821
Wolffish	93,647	482	3,142	79	2,096,569	31,334			4,100	41	2,197,458	31,936
Yellow perch	534	80									534	80
Total	83,071,766	848,662	306,475	8,841	359,144,370	8,196,646	11,648,054	282,642	7,450,301	255,662	461,620,966	9,592,453
SHELLFISH, ETC.												
Crabs:												
Hard	501,666	15,126			5,106,515	24,795	20,478	369	400	25	5,629,059	40,315
King							6,574	18			6,574	18
Lobsters	5,897,685	1,000,094	216,929	48,230	1,928,616	381,619	708,095	113,933	336,800	64,135	9,088,125	1,608,041
Shrimp					41,200	2,170					41,200	2,170
Periwinkles and cockles	15,516	825			65,700	6,350	109,442	5,201			190,658	12,376
Clams:												
Hard, public [1]	11,594	1,054			1,766,525	215,048	1,068,891	125,047	101,605	20,735	2,948,615	361,884
Hard, private [1]					2,200	400	89,045	12,249			91,245	12,649
Razor					358,400	15,874					358,400	15,874
Soft, public [2]	6,548,620	224,005			2,836,090	245,469	32,384	4,214	13,683	1,953	9,430,777	475,641
Surf or skimmer					59,240	3,575					59,240	3,575
Mussels, sea	110,596	2,534			30,000	3,000	650	38			141,246	5,572
Oysters: [3]												
Market, public, spring							26,880	3,840	10,150	1,250	37,030	5,090
Market, public, fall							38,444	5,507	11,550	1,450	49,944	6,957
Market, private, spring					75,161	25,680	1,525,384	211,748	613,547	81,383	2,214,092	318,811
Market, private, fall					105,448	34,357	1,527,055	211,897	1,223,661	170,261	2,856,164	416,515

[1] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island and 10 pounds in Connecticut.

[2] Statistics on soft clams used in this table are based on yield of 15 pounds of meats per bushel in Maine and Massachusetts; 16 pounds in Rhode Island, and 14 pounds in Connecticut.

[3] Statistics on oysters used in this table are based on yields of 6.57 pounds of meats per bushel in Massachusetts, 6.96 pounds in Rhode Island and 6.81 pounds in Connecticut.

Fisheries of the New England States, 1933—Continued

CATCH: BY STATES—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH, ETC.—continued												
Scallops:												
Bay					500, 115	$180, 975	63, 120	$12, 943	57, 500	$10, 000	620, 735	$203, 918
Sea	1, 073, 172	$145, 884			1, 029, 097	115, 344			55, 926	6, 226	2, 158, 195	267, 454
Squid	203	2			570, 536	7, 564	501, 851	11, 618	2, 905	50	1, 075, 495	19, 234
Irish moss					11, 650	582					11, 650	582
Bloodworms	642, 852	42, 724			17, 759	28, 000					660, 611	70, 724
Sandworms	618, 567	25, 980			21, 656	19, 500					640, 223	45, 480
Sea urchins	5, 845	217									5, 845	217
Total	15, 426, 316	1, 458, 445	216, 929	$48, 230	14, 525, 908	1, 310, 332	5, 718, 293	718, 622	2, 427, 727	357, 468	38, 315, 173	3, 893, 097
Grand total	98, 498, 082	2, 307, 107	523, 404	57, 071	373, 670, 278	9, 506, 978	17, 366, 347	1, 001, 264	9, 878, 028	613, 130	499, 936, 139	13, 485, 550

NOTE.—Of the total catch in Massachusetts, 10,619,503 pounds of fishery products, valued at $231,810, were taken in the southern winter trawl fishery off southern New Jersey, Maryland, Virginia, and North Carolina. Of the total catch in Connecticut, 111,837 pounds of fishery products, valued at $4,641, were taken in the same fishery. These products consisted principally of croaker, flounders, scup, and sea bass.

Fisheries of the New England States, 1933—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maine		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:										
Hard..number..	1,504,998	$15,126	15,319,545	$24,795	61,434	$369	1,200	$25	16,887,177	$40,315
King......do....					1,644	18			1,644	18
Clams:										
Hard, public bushels..	1,054	1,054	160,593	215,048	97,172	125,047	10,160	20,735	268,979	361,884
Hard, private do....			200	400	8,095	12,249			8,295	12,649
Razor......do....			11,200	15,874					11,200	15,874
Soft, public do....	436,575	224,005	189,073	245,469	2,024	4,214	977	1,953	628,649	475,641
Surf or skimmer do....			3,485	3,575					3,485	3,575
Mussels, sea..do....	9,216	2,534	3,000	3,000	50	38			12,266	5,572
Oysters:										
Market, public, spring...do....					3,862	3,840	1,490	1,250	5,352	5,090
Market, public, fall......do....					5,524	5,507	1,696	1,450	7,220	6,957
Market, private, spring...do....			11,440	25,680	219,164	211,748	90,095	81,383	320,699	318,811
Market, private, fall......do....			16,050	34,357	219,404	211,897	179,686	170,261	415,140	416,515
Periwinkles and cockles......do....	862	825	3,650	6,350	6,080	5,201			10,592	12,376
Scallops:										
Bay......do....			83,352	180,975	10,520	12,943	10,000	10,000	103,872	203,918
Sea......do....	178,862	145,884	171,516	115,344			9,321	6,226	359,699	267,454

SEED OYSTER FISHERY

Item	Rhode Island		Connecticut		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels			93		93	
On boats and shore:						
Regular	5				5	
Casual	6		154		160	
Total	11		247		258	
Vessels:						
Steam			3		3	
Net tonnage			245		245	
Motor			18		18	
Net tonnage			271		271	
Sail			2		2	
Net tonnage			17		17	
Total vessels			23		23	
Total net tonnage			533		533	
Boats:						
Motor			7		7	
Other	2		88		90	
Apparatus:						
Dredges			101		101	
Yards at mouth			97		97	
Tongs	2		94		96	
Rakes			46		46	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	995	$499	30,463	$12,185	31,458	$12,684
Seed, public, fall			43,163	17,265	43,163	17,265
Seed, private, spring			207,185	69,617	207,185	69,617
Total	995	499	280,811	99,067	281,806	99,566

NOTE.—Of the total number of persons fishing for seed oysters, 135 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 78 boats other than motor, 82 tongs, and 46 rakes

Industries related to the fisheries of the New England States, 1933

OPERATING UNITS, SALARIES, AND WAGES

Item	Maine and New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	149	43	8	56	256
On boats	16	----	38	----	54
Total	165	43	46	56	310
Vessels:					
Steam	----	----	----	1	1
Net tonnage	----	----	----	67	67
Motor	74	12	4	14	104
Net tonnage	813	338	39	425	1,615
Total vessels	74	12	4	15	105
Total net tonnage	813	338	39	492	1,682
Boats	11	----	20	----	31
Wholesale and manufacturing:					
Establishments	131	165	35	31	362
Persons engaged:					
Proprietors	112	89	29	36	266
Salaried employees	142	587	35	35	799
Wage earners:					
Average for season	4,383	3,012	301	416	8,112
Average for year	1,298	2,336	207	329	4,170
Paid to salaried employees	$253,670	$1,291,380	$83,949	$85,198	$1,714,197
Paid to wage earners	$765,974	$2,382,013	$159,894	$387,994	$3,695,875
Total salaries and wages	$1,019,644	$3,673,393	$243,843	$473,192	$5,410,072
Fishermen manufacturing	612	1,480	109	22	2,223

PRODUCTS MANUFACTURED

Item	Maine		Massachusetts		Rhode Island		Connecticut	
BY MANUFACTURING ESTABLISHMENTS	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives: Salted, tight pack pounds	567,238	$9,669	(1)	(1)	----	----	----	----
Cod:								
Fresh sticks do	251,778	46,844	----	----	----	----	----	----
Fresh fillets do	109,857	12,903	4,827,997	$525,929	----	----	----	----
Frozen fillets do	(1)	(1)	3,969,607	344,363	----	----	----	----
Salted:								
Green [2] do	734,166	28,885	593,764	29,648	----	----	----	----
Dry do	59,196	2,054	(1)	(1)	----	----	----	----
Boneless, including absolutely boneless pounds	131,175	16,333	6,312,775	1,189,945	----	----	----	----
Smoked fillets do	44,889	6,718	1,017,034	147,241	----	----	----	----
Oil, cod gallons	3,350	670	41,981	21,482	----	----	----	----
Oil, cod-liver do	----	----	19,552	14,708	----	----	----	----
Cusk:								
Fresh sticks pounds	136,177	25,067	----	----	----	----	----	----
Fresh fillets do	9,612	958	311,954	39,186	----	----	----	----
Salted:								
Green [2] do	31,150	673	(1)	(1)	----	----	----	----
Boneless, including absolutely boneless pounds	(1)	(1)	23,785	2,762	----	----	----	----
Flounders:								
Fresh fillets do	----	----	867,450	148,917	----	----	----	----
Frozen fillets do	(1)	(1)	264,924	34,984	----	----	----	----
Haddock:								
Fresh sticks do	69,168	12,559	----	----	----	----	----	----
Fresh fillets do	163,908	26,982	15,016,474	1,750,062	----	----	----	----
Frozen fillets do	(1)	(1)	18,383,269	1,457,461	----	----	----	----
Salted:								
Green [2] do	31,400	803	----	----	----	----	----	----
Boneless, including absolutely boneless pounds	----	----	98,295	19,220	----	----	----	----
Finnan haddie do	131,400	18,960	931,754	103,793	(1)	(1)	----	----

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[1] This item has been included under "Unclassified products."

[2] This item is usually an intermediate product and although included in the total, may also be shown in its final stage of processing in this or another State.

Industries related to the fisheries of the New England States, 1933—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
BY MANUFACTURING ESTABLISHMENTS—continued								
Hake:								
Fresh sticks----pounds--	200,630	$29,454	--------	--------	--------	--------	--------	--------
Fresh fillets--------do----	64,285	7,305	1,013,615	$85,706	--------	--------	--------	--------
Frozen fillets------do----	(1)	(1)	27,850	2,161	--------	--------	--------	--------
Salted:								
Green [2]--------do----	334,123	10,069	(1)	(1)	--------	--------	--------	--------
Dry-----------do----	(1)	(1)	271,172	8,723	--------	--------	--------	--------
Halibut, fresh fillets---do----	--------	--------	6,659	1,502	--------	--------	--------	--------
Herring, sea:								
Salted, round------do----	560,700	11,439	(1)	(1)	--------	--------	--------	--------
Smoked:								
Bloaters:								
Soft-------do----	286,662	10,954	585,332	52,782	--------	--------	--------	--------
Hard------do----	259,830	6,952	(1)	(1)	--------	--------	--------	--------
Boneless-------do----	1,953,365	187,020	--------	--------	--------	--------	--------	--------
Lengthwise----do----	114,915	9,456	--------	--------	--------	--------	--------	--------
Medium-scaled do----	168,370	14,247	(1)	(1)	--------	--------	--------	--------
Kippered------do----	(1)	(1)	169,505	17,131	--------	--------	--------	--------
Canned "sardines" standard cases--	980,906	2,397,348	--------	--------	--------	--------	--------	--------
Scrap, green-------tons--	193	507	--------	--------	--------	--------	--------	--------
Meal--------------do----	898	24,601	--------	--------	--------	--------	--------	--------
Oil--------------gallons--	69,391	7,963	--------	--------	--------	--------	--------	--------
Mackerel:								
Fresh fillets-----pounds--	--------	--------	21,065	3,343	--------	--------	--------	--------
Salted:								
Fillets---------do----	(1)	(1)	1,767,746	133,250	--------	--------	--------	--------
Split-----------do----	84,420	2,711	1,285,360	91,823	--------	--------	--------	--------
Pollock:								
Fresh fillets-------do----	--------	--------	403,389	32,107	--------	--------	--------	--------
Frozen fillets------do----	--------	--------	1,091,401	65,147	--------	--------	--------	--------
Salted:								
Green [2]--------do----	89,055	1,824	(1)	(1)	--------	--------	--------	--------
Dry-----------do----	42,387	2,004	941,442	37,115	--------	--------	--------	--------
Wolffish, fresh fillets---do----	--------	--------	85,439	6,262	--------	--------	--------	--------
Crab meat, packaged, fresh-cooked-----------pounds--	67,441	33,571	151,087	62,979	(1)	(1)	--------	--------
Lobster meat, packaged, fresh-cooked------pounds--	--------	--------	79,020	86,420	--------	--------	--------	--------
Clams, hard, fresh-shucked gallons--	--------	--------	--------	--------	2,660	$4,815	(1)	(1)
Clams, soft:								
Fresh-shucked-----do----	--------	--------	--------	--------	12,145	12,083	--------	--------
Canned:								
Whole standard cases--	76,698	248,190	--------	--------	--------	--------	--------	--------
Chowder------do----	36,567	94,452	(1)	(1)	--------	--------	--------	--------
Juice and bouillon standard cases--	19,441	44,157	--------	--------	--------	--------	--------	--------
Marine-shell products, buttons-----------------gross--	(1)	(1)	(1)	(1)	--------	--------	1,017,225	$635,213
Oysters, fresh-shucked gallons--	--------	--------	--------	--------	301,942	514,470	175,313	313,445
Unclassified products:								
Fillets, fresh and frozen pounds--	[3] 7,673	[3] 1,310	[4] 1,637,522	[4] 136,046	(5)	(5)		
Salted-------------do----	[6] 31,363	[6] 2,639	[7] 1,601,189	[7] 103,216	--------	--------	--------	--------
Smoked------------do----	[8] 251,757	[8] 25,587	[9] 764,708	[9] 151,769	(5)	(5)	(5)	(5)

[1] This item has been included under "Unclassified products."

[2] This item is usually an intermediate product and although included in the total, may also be shown its final stage of processing in this or another State.

[3] Includes frozen fillets of cod, cusk, flounders, haddock, and hake.

[4] Includes pandressed flounders, fresh steaks of cod, cusk, and pollock; frozen swordfish steaks; frozen whiting sticks; and frozen fillets of halibut, mackerel, rosefish, salmon, and wolffish.

[5] This item is included with miscellaneous.

[6] Includes dry-salted cusk, haddock, and hake; boneless cusk and hake; and salted sea herring and mackerel fillets.

[7] Includes green-salted cusk, hake, and pollock; dry-salted cod, cusk, haddock, and tongues; boneless hake; salted alewives, tight-pack; and salted sea herring, round and split.

[8] Includes finnan cod; smoked cusk, haddock, and hake fillets; kippered herring; and spiced sea herring.

[9] Includes smoked alewives, butterfish, carp, flounders, halibut, lake trout, mackerel, salmon, shad, and whitefish; smoked cusk, haddock, and hake fillets; hard smoked sea herring, bloaters, and medium scaled; spiced sea herring; and smoked and spiced salmon.

Industries related to the fisheries of the New England States, 1933—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
BY MANUFACTURING ESTABLISHMENTS—continued								
Unclassified products—Con.								
Canned:								
Fish cakes, balls, etc.	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
standard cases	5,469	$19,736	59,605	$424,318	--------	--------	--------	--------
Fish flakes do	(10)	(10)	2,183	18,489	--------	--------	--------	--------
Other do	[11] 17,989	[11] 137,795	[12] 34,186	[12] 131,958	--------	--------	--------	--------
Meal, ground fish tons	430	16,080	8,653	386,017	--------	--------	--------	--------
Miscellaneous	--------	[13] 196,892	--------	[14] 838,958	--------	[15] 233,771	--------	[16] $147,213
Total	--------	3,754,341	--------	8,706,923	--------	765,139	--------	1,095,871
BY FISHERMEN								
Alewives:								
Corned pounds	--------	--------	80,000	4,800	--------	--------	--------	--------
Salted, tight-pack do	263,100	439	420,000	12,600	--------	--------	--------	--------
Smoked do	165,085	4,848	12,000	600	--------	--------	--------	--------
Cod, salted:								
Green [2] do	--------	--------	403,778	11,087	--------	--------	--------	--------
Dry do	5,860	226	--------	--------	--------	--------	--------	--------
Cusk, dry-salted do	620	11	2,714	52	--------	--------	--------	--------
Haddock, green-salted [2] do	--------	--------	14,365	288	--------	--------	--------	--------
Hake, green-salted [2] do	--------	--------	3,030	31	--------	--------	--------	--------
Hake, dry-salted do	4,090	77	--------	--------	--------	--------	--------	--------
Halibut, green-salted do	--------	--------	2,115	97	--------	--------	--------	--------
Mackerel, salted, split do	600	45	25,800	817	--------	--------	--------	--------
Pollock, green-salted [2] do	--------	--------	90	1	--------	--------	--------	--------
Crab meat, packaged, fresh-cooked pounds	3,459	1,558	5,000	2,500	1,200	480	--------	--------
Clams, razor, fresh-shucked gallons	--------	--------	36,078	17,729	--------	--------	--------	--------
Clams, soft:								
Fresh-shucked do	70,281	48,225	19,000	24,000	50	75	500	1,000
Steamed pounds	161,887	11,279	--------	--------	--------	--------	--------	--------
Clams, surf or skimmer, fresh-shucked gallons	--------	--------	5,922	4,050	--------	--------	--------	--------
Oysters, fresh-shucked do	--------	--------	--------	--------	--------	--------	2,840	4,680
Scallops, bay, fresh-shucked gallons	--------	--------	55,468	197,520	7,181	29,247	900	3,600
Scallops, sea, fresh-shucked gallons	27,151	56,242	114,341	115,031	--------	--------	--------	--------
Total	--------	122,950	--------	391,203	--------	29,802	--------	9,280
Grand total	--------	3,877,291	--------	9,098,126	--------	794,941	--------	1,105,151

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[2] This item is usually an intermediate product and although included in the total, may also be shown its final stage of processing in this or another State.

[10] This item is included with other canned fishery products.

[11] Includes canned finnan haddie, fish flakes, and mackerel.

[12] Includes canned finnan haddie; haddock chowder; mackerel; hard and soft clam chowder; dog food; ground fish roe; and rat bait.

[13] Includes dry-scrap from herring; clam meal; marine shell buttons; and pearl essence.

[14] Includes dry-scrap from groundfish; glue; isinglass; and marine and fresh-water shell products.

[15] Includes packaged fresh-cooked crab meat; fresh-shucked bay scallops; finnan haddie; canned hard clam chowder and oyster puree; oyster-shell products; and marine-shell novelties.

[16] Includes fresh-shucked hard clams; smoked butterfish, carp, mackerel, paddlefish or spoonbill cat, salmon, and whitefish; and marine-shell novelties.

NOTE.—The total value of manufactured products for the New England States was as follows: By manufacturing establishments, $14,322,274; and by fishermen, $553,235. Some of the above products may have been manufactured from products imported from another State or country; therefore they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 2,119 have also been included as fishermen and 45 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MAINE

Fisheries of Maine, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		
	Mackerel	Other		Anchor	Drift	Hand	Trawl	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	86	65	------	52	8	12	187	------
On boats and shore:								
Regular	36	118	54	104	39	210	519	------
Casual	------	------	8	70	4	829	32	3
Total	122	183	62	226	51	1,051	738	3
Vessels:								
Motor	16	14	------	11	2	6	18	------
Net tonnage	145	155	------	95	23	45	321	------
Sail	------	1	------	------	------	------	------	------
Net tonnage	------	47	------	------	------	------	------	------
Total vessels	16	15	------	11	2	6	18	------
Total net tonnage	145	202	------	95	23	45	321	------
Boats:								
Motor	9	36	30	77	34	176	411	------
Other	9	36	28	45	2	7	12	3
Accessory boats	12	11	------	2	3	------	80	------
Apparatus:								
Number	25	51	31	1,736	709	5,089	34,134	16
Length yards	6,648	7,040	3,100	------	------	------	------	------
Square yards	------	------	------	556,491	230,396	------	------	------
Hooks, baits or snoods	------	------	------	------	------	5,259	1,155,574	1,600

Item	Pound nets	Floating traps	Weirs	Fyke nets	Dip nets	Bag nets	Pocket nets	Otter trawls	Box traps
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	------	------	------	------	------	------	------	50	------
On boats and shore:									
Regular	3	19	172	2	------	7	------	73	------
Casual	------	2	96	12	124	73	1	2	10
Total	3	21	268	14	124	80	1	125	10
Vessels:									
Motor	------	------	------	------	------	------	------	13	------
Net tonnage	------	------	------	------	------	------	------	130	------
Boats:									
Motor	3	16	1	------	------	------	------	37	------
Other	------	2	185	12	------	9	------	------	4
Apparatus:									
Number	3	21	213	56	124	112	2	50	13
Yards at mouth	------	------	------	------	------	------	------	1,235	------

Fisheries of Maine, 1933—Continued

OPERATING UNITS: By gear—Continued

Item	Pots			Harpoons	Spears	Dredges, scallop	Hoes	By hand	Total, exclusive of duplication
	Crab	Eel	Lobster						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			6	78		43			443
On boats and shore:									
Regular	43	3	2, 426	46		230	999	28	3, 748
Casual	14	13	36	6	26	2	606	22	1, 841
Total	57	16	2, 468	130	26	275	1, 605	50	6, 032
Vessels:									
Motor			4	16		6			73
Net tonnage			23	314		69			856
Sail									1
Net tonnage									47
Total vessels			4	16		6			74
Total net tonnage			23	314		69			903
Boats:									
Motor	22		1, 794	27		140	29		2, 342
Other	34	15	537		21		715	9	1, 396
Accessory boats				64					172
Apparatus:									
Number	2, 296	222	180, 439	43	26	155	1, 605		
Yards at mouth						231			

CATCH: By gear

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	199, 453	$1, 910	103, 100	$507			47, 000	$400		
Bluefish									85	$11
Butterfish	17, 936	764	6, 630	248			20	1	109	7
Cod							4, 106, 347	73, 662		
Cusk							54, 442	597		
Flounders							31, 497	778		
Grayfish									316	7
Haddock							2, 176, 218	33, 990		
Hake							878, 384	8, 469		
Halibut							4, 660	50		
Herring, sea	176, 900	1, 251	24, 061, 530	94, 869			17, 375	45		
Mackerel	2, 105, 293	27, 965	945, 567	8, 472			32, 882	1, 372	345, 655	5, 835
Pollock	910	3	75, 302	377			2, 089, 751	17, 979		
Salmon							5, 215	1, 150	49	10
Shad	110, 272	867	28, 790	212			2, 537	200		
Sharks							19, 945	135	9, 725	92
Smelt	19	1			93, 789	$7, 431	66, 496	8, 910		
Sturgeon							1, 559	112	749	112
Tomcod					611	10				
Tuna or "horse mackerel"							92	2		
Wolffish							3, 525	19		
Lobsters							128	25		
Total	2, 610, 783	32, 761	25, 220, 919	104, 685	94, 400	7, 441	9, 538, 073	147, 896	356, 688	6, 074

Fisheries of Maine, 1933—Continued

CATCH: BY GEAR—Continued

Species	Lines					
	Hand		Trawl		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod	1, 108, 156	$11, 186	3, 356, 442	$50, 546		
Cunners	175	5				
Cusk	8, 800	69	1, 431, 293	16, 713		
Eels, common					11, 346	$809
Flounders			16, 630	229		
Haddock	624, 077	14, 715	4, 777, 398	126, 526		
Hake	655, 601	4, 218	4, 729, 610	47, 045		
Halibut	7, 143	880	30, 406	3, 198		
Mackerel	5, 198	156	45	6		
Pollock	390, 844	2, 345	359, 756	2, 218		
Rosefish			233	2		
Sharks			253	3		
Skates			5, 013	85		
Smelt	222, 014	24, 787	4, 394	27		
Wolffish			80, 682	423		
Total	3, 022, 008	58, 361	14, 792, 155	247, 021	11, 346	809

Species	Pound nets		Floating traps		Weirs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					211, 450	$468
Butterfish	8, 603	$405	65, 872	$3, 615		
Herring, sea	20, 435	186	184, 913	1, 490	19, 313, 835	62, 975
Mackerel	76, 876	1, 294	461, 025	7, 293	526, 566	5, 347
Pollock	1, 314	9	20, 873	140	1, 021	10
Salmon	112	22	4, 245	935	13, 138	3, 756
Shad	491	6	2, 339	17	34, 460	531
Smelt	1, 767	133	8, 218	610	7, 223	686
Squid	203	2				
Total	109, 801	2, 057	747, 485	14, 100	20, 107, 693	73, 773

Species	Fyke nets		Dip nets		Bag nets		Pocket nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			1, 142, 075	$3, 086						
Butterfish									305	$19
Cod									765, 949	10, 090
Cusk									88, 831	963
Eels, common	2, 086	$125								
Flounders									1, 128, 284	26, 487
Haddock									1, 728, 863	40, 513
Hake									820, 418	6, 538
Halibut									7, 802	648
Pollock									66, 294	333
Rosefish									1, 830	12
Salmon			1, 885	396						
Shad									12	1
Smelt			15, 002	1, 905	109, 532	$12, 199	1, 536	$138		
Suckers	50, 518	1, 502								
Tomcod	953	29			400	12				
Wolffish									9, 440	40
Yellow perch	534	80								
Total	54, 091	1, 736	1, 158, 962	5, 387	109, 932	12, 211	1, 536	138	4, 618, 027	85, 644

Fisheries of Maine, 1933—Continued

CATCH: BY GEAR—Continued

Species	Box traps		Pots						Harpoons	
			Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	28, 910	$2, 512	------	------	36, 284	$2, 661	------	------	------	------
Swordfish	------	------	------	------	------	------	------	------	323, 939	$39, 381
Tuna or "horse mackerel"	------	------	------	------	------	------	------	------	100, 440	2, 067
Crabs, hard	------	------	449, 134	$13, 700	------	------	52, 532	$1, 426	------	------
Lobsters	------	------	256	64	------	------	5, 897, 301	1, 000, 005	------	------
Total	28, 910	2, 512	449, 390	13, 764	36, 284	2, 661	5, 949, 833	1, 001, 431	424, 379	41, 448

Species	Spears		Dredges, scallops		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	23, 399	$1, 921	------	------	------	------	------	------
Flounders	2, 258	23	------	------	------	------	------	------
Skates	2, 968	30	------	------	------	------	------	------
Clams:								
Hard, public	------	------	------	------	11, 594	$1, 054	------	------
Soft, public	------	------	------	------	6, 548, 620	224, 005	------	------
Mussels, sea	------	------	------	------	------	------	110, 596	$2, 534
Periwinkles	------	------	------	------	------	------	15, 516	825
Scallops, sea	------	------	1, 073, 172	$145, 884	------	------	------	------
Bloodworms	------	------	------	------	642, 852	42, 724	------	------
Sandworms	------	------	------	------	618, 567	25, 980	------	------
Sea urchins	------	------	------	------	------	------	5, 845	217
Total	28, 625	1, 974	1, 073, 172	145, 884	7, 821, 633	293, 763	131, 957	3, 576

OPERATING UNITS: BY COUNTIES

Item	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	259	18	------	78	56	------	------	------	25	7
On boats and shore:										
Regular	887	654	------	620	433	------	187	22	752	193
Casual	33	610	168	176	197	15	68	59	453	62
Total	1, 179	1, 282	168	874	686	15	255	81	1, 230	262
Vessels:										
Motor	34	6	------	16	10	------	------	------	5	2
Net tonnage	499	49	------	144	86	------	------	------	63	15
Sail	------	------	------	------	------	------	------	------	1	------
Net tonnage	------	------	------	------	------	------	------	------	47	------
Total vessels	34	6	------	16	10	------	------	------	6	2
Total net tonnage	499	49	------	144	86	------	------	------	110	15
Boats:										
Motor	511	485	------	439	226	------	84	8	424	165
Other	217	294	7	129	163	12	67	37	420	50
Accessory boats	139	1	------	12	14	------	------	------	5	1
Apparatus:										
Purse seines:										
Mackerel	12	------	------	3	8	------	------	------	------	2
Length, yards	3, 260	------	------	528	2, 600	------	------	------	------	260
Other	10	2	------	6	23	------	1	------	9	------
Length, yards	1, 760	360	------	970	2, 920	------	200	------	830	------
Haul seines	30	------	------	1	------	------	------	------	------	------
Length, yards	3, 000	------	------	100	------	------	------	------	------	------
Gill nets:										
Anchor	1, 069	64	------	8	140	42	3	20	318	72
Square yards	421, 879	18, 320	------	3, 122	52, 254	3, 160	270	2, 242	27, 948	27, 296
Drift	202	------	------	------	5	------	60	------	------	442
Square yards	96, 123	------	------	------	233	------	27, 960	------	------	106, 080

Fisheries of Maine, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Num. ber*	*Number*	*Number*	*Number*	*Number*
Lines:										
Hand	68	1,724	820	993	1,089		275		114	6
Hooks	68	1,777	820	1,075	1,093		275		144	7
Trawl	12,380	2,352		2,310	1,000		1,780	72	2,980	1,260
Hooks	619,000	71,424		115,500	50,000		89,000	3,600	144,050	63,000
Trot with hooks										16
Hooks										1,600
Pound nets	3									
Floating traps	5				3		9	4		
Weirs		84		9	3	13	1	27	76	
Fyke nets		1	38		17					
Dip nets		4		32	6			10	60	12
Bag nets		9				2		41	60	
Pocket nets			2							
Otter trawls	26	17		3	1		2		1	
Yards at mouth	630	430		75	30		45		25	
Box traps		2		6					3	2
Pots:										
Crab	2,271				25					
Eel	21				65	16	18	83	4	15
Lobster	22,089	40,116		37,913	18,813		4,879	125	46,042	10,462
Harpoons	30				1		5			7
Spears		10		2	2		6		3	3
Dredges:										
Scallop	54	53		27	7				14	
Yards at mouth	72	78		55	9				17	
Hoes	339	338		159	202		102	17	410	38

CATCH: BY COUNTIES

Species	Cumberland		Hancock		Kennebec	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	52,586	$661	192,630	$572		
Butterfish	40,488	2,032				
Cod	5,218,503	96,283	1,120,583	10,571		
Cunners	175	5				
Cusk	1,214,160	14,547	83,411	519		
Eels, common	924	34	8,815	857	2,086	$125
Flounders	560,008	11,115	397,414	11,136		
Grayfish	316	7				
Haddock	4,770,028	101,984	1,326,816	27,835		
Hake	3,966,122	43,870	862,784	4,562		
Halibut	15,2 0	1,255	10,097	992		
Herring, sea	8,170,795	37,583	2,934,984	11,572		
Mackerel	772,889	13,446	105,924	1,271		
Pollock	2,327,787	19,486	68,114	331		
Rosefish	2,063	14				
Salmon	623	124	7,099	2,081		
Shad	5,122	137				
Sharks	22,988	164				
Smelt	107,854	7,957	63,786	8,558	79,584	7,165
Sturgeon	708	68				
Suckers					31,851	955
Swordfish	323,939	39,381				
Tomcod	611	10			953	29
Tuna or "horse mackerel"	65,642	1,282				
Wolffish	70,842	361				
Yellow perch					142	21
Crabs, hard	473,016	14,268				
Lobsters	648,284	116,974	1,393,672	227,273		
Clams:						
Hard, public	9,394	854				
Soft, public	1,487,060	73,240	939,070	23,488		
Mussels, sea	110,596	2,534				
Scallops, sea	50,166	9,062	232,752	53,627		
Squid	203	2				
Bloodworms	136,752	21,468				
Total	30,625,924	630,208	9,747,951	385,245	114,616	8,295

Fisheries of Maine, 1933—Continued

CATCH: By counties—Continued

Species	Knox		Lincoln		Penobscot	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	436, 240	$1, 099	581, 440	$2, 099		
Butterfish			32, 846	1, 420		
Cod	695, 858	7, 607	989, 325	9, 504		
Cusk	46, 181	473	58, 533	362		
Eels, common	7, 398	550	11, 127	801	5, 025	$126
Flounders	119, 094	3, 206	41, 944	735		
Haddock	1, 358, 851	36, 037	416, 807	7, 703		
Hake	791, 237	5, 134	484, 408	2, 746		
Halibut	8, 681	910	808	81		
Herring, sea	1, 982, 365	8, 694	9, 220, 728	35, 435		
Mackerel	278, 311	3, 616	2, 369, 765	23, 961		
Pollock	305, 209	1, 490	86, 707	455		
Salmon			2, 162	438	1, 257	368
Shad	90	2	137, 780	1, 155		
Sharks			347	3		
Smelt	28, 787	3, 596	21, 350	2, 449	7, 641	923
Sturgeon			167	11		
Suckers			18, 667	547		
Tuna or "horse mackerel"			524	10		
Wolffish			632	4		
Yellow perch			392	59		
Crabs, hard			28, 650	858		
Lobsters	1, 595, 485	267, 980	619, 488	104, 247		
Clams, soft, public	721, 465	20, 356	681, 580	20, 908		
Scallops, sea	767, 934	77, 927	18, 900	4, 500		
Bloodworms			506, 100	21, 256		
Sandworms			618, 567	25, 980		
Sea urchins			3, 600	60		
Total	9, 143, 186	438, 677	16, 953, 344	267, 787	13, 923	1, 417

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	15, 000	$300			326, 615	$640	98, 567	$1, 000
Bluefish							85	11
Butterfish	25, 641	1, 572					500	35
Cod	409, 808	6, 377	38, 246	$780	620, 740	9, 782	243, 831	4, 580
Cusk	87, 258	1, 181			22, 892	199	70, 931	1, 061
Eels, common	6, 991	629	11, 600	1, 020	12, 053	1, 104	36, 006	2, 782
Flounders	28, 953	501			28, 282	779	2, 974	45
Haddock	437, 704	10, 670	4, 210	211	618, 140	20, 326	373, 999	10, 978
Hake	414, 688	3, 998	539	11	216, 777	2, 132	347, 458	3, 817
Halibut	1, 453	129			7, 402	1, 230	6, 290	179
Herring, sea	468, 020	2, 879	17, 850	128	20, 980, 246	64, 525		
Mackerel	289, 448	5, 192	72, 400	1, 034	288, 772	2, 193	321, 598	7, 027
Pollock	69, 798	457			111, 138	924	37, 312	271
Salmon	1, 073	214	4, 560	1, 305	7, 870	1, 739		
Shad	1, 449	9			34, 460	531		
Sharks	1, 565	15					5, 023	48
Skates					7, 981	115		
Smelt	53, 476	6, 180	49, 704	7, 455	116, 372	12, 400	1, 436	144
Sturgeon	749	112					684	33
Tomcod					400	12		
Tuna or "horse mackerel"	19, 535	375					14, 831	402
Wolffish	11, 655	61			1, 173	5	9, 345	51
Lobsters	133, 570	23, 809	2, 509	602	1, 057, 423	173, 009	447, 254	86, 200
Clams:								
Hard, public	2, 200	200						
Soft, public	754, 425	29, 625	192, 240	12, 440	1, 687, 265	37, 551	85, 515	6, 397
Periwinkles					15, 516	825		
Scallops, sea					3, 420	768		
Sea urchins					2, 245	157		
Total	3, 234, 459	94, 485	393, 858	24, 986	26, 167, 182	330, 946	2, 103, 639	125, 061

NEW HAMPSHIRE

Fisheries of New Hampshire, 1933 [1]

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, anchor	Lines		Pots, lobster	Bag nets	Total, exclusive of duplication
			Hand	Trawl			
Fishermen, on boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	2	2	--------	8	44	--------	48
Casual	--------	--------	29	--------	8	15	52
Total	2	2	29	8	52	15	100
Boats:							
Motor	--------	2	--------	5	32	--------	34
Other	1	--------	--------	--------	16	--------	17
Apparatus:							
Number	1	4	116	260	2,990	30	--------
Length, yards	35	--------	--------	--------	--------	--------	--------
Square yards	--------	2,160	--------	--------	--------	--------	--------
Hooks	--------	--------	116	13,000	--------	--------	--------

CATCH: BY GEAR

Species	Haul seines		Gill nets, anchor		Lines				Pots, lobster		Bag nets	
					Hand		Trawl					
	Lbs.	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*
Cod	------	------	------	------	------	------	28,602	$858	------	------	------	------
Cusk	------	------	------	------	------	------	17,161	343	------	------	------	------
Haddock	------	------	------	------	------	------	60,063	2,703	------	------	------	------
Hake	------	------	------	------	------	------	168,749	2,531	------	------	------	------
Herring, sea	2,000	$20	------	------	------	------	------	------	------	------	------	------
Mackerel	------	------	1,050	$53	------	------	------	------	------	------	------	------
Pollock	------	------	------	------	------	------	11,441	114	------	------	------	------
Smelt	------	------	------	------	9,667	$1,450	------	------	------	------	4,600	$690
Wolffish	------	------	------	------	------	------	3,142	79	------	------	------	------
Lobsters	------	------	------	------	------	------	------	------	216,929	$48,230	------	------
Total	2,000	20	1,050	53	9,667	1,450	289,158	6,628	216,929	48,230	4,600	690

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[1] The commercial fisheries of New Hampshire are confined to Rockingham County.

MASSACHUSETTS

Fisheries of Massachusetts, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets			Lines	
	Mackerel	Other		Anchor	Drift	Run-around	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	925	--------	--------	130	533	4	111	1,122
On boats and shore:								
Regular	62	--------	37	14	168	--------	228	590
Casual	--------	6	8	--------	8	--------	72	12
Total	987	6	45	144	709	4	411	1,724
Vessels:								
Motor	83	--------	--------	15	68	1	11	69
Net tonnage	2,729	--------	--------	285	1,553	5	301	3,326
Boats:								
Motor	14	2	4	7	76	--------	176	227
Other	14	4	20	7	58	--------	55	31
Accessory boats	66	--------	--------	7	26	--------	--------	612
Apparatus:								
Number	97	2	15	704	4,105	1	505	47,836
Length, yards	45,720	260	1,655	--------	--------	--------	--------	--------
Square yards	--------	--------	--------	280,655	1,530,960	1,800	--------	--------
Hooks, baits, or snoods	--------	--------	--------	--------	--------	--------	671	2,380,062

Fisheries of Massachussetts, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines—Con.	Pound nets	Floating traps	Weirs	Fyke nets	Dip nets	Push nets	Otter trawls
	Troll							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels								2,067
On boats and shore:								
Regular	5	129	40	6	11	120		199
Casual		2			7	42	100	
Total	5	131	40	6	18	162	100	2,266
Vessels:								
Steam								13
Net tonnage								2,097
Motor								245
Net tonnage								9,680
Total vessels								258
Total net tonnage								11,777
Boats:								
Motor	5	35	16	2		24		79
Other		57	15	2	6	35	50	
Accessory boats			6					
Apparatus:								
Number	8	86	17	4	24	130	50	366
Yards at mouth								21,084
Hooks, baits, or snoods	8							

Item	Box traps	Pots				Harpoons	Spears
		Crab	Eel	Lobster	Periwinkle or cockle		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						632	
On boats and shore:							
Regular	3	25	36	717	22	88	68
Casual		4	15	294			117
Total	3	29	51	1,011	22	720	185
Vessels:							
Steam						1	
Net tonnage						180	
Motor						88	
Net tonnage						3,128	
Total vessels						89	
Total net tonnage						3,308	
Boats:							
Motor		20	27	650	12	37	
Other		2	27	383	8	3	125
Accessory boats						225	
Apparatus:							
Number	3	1,095	1,565	65,147	935	126	185

Fisheries of Massachusetts, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
	Clam	Oyster	Scallop						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	8	116						3,971
On boats and shore:									
Regular	110	25	391	132	403	452	183	18	2,781
Casual			383	34	251	493	77	8	1,652
Total	115	33	890	166	654	945	260	26	8,404
Vessels:									
Steam									13
Net tonnage									2,097
Motor	2	3	19						365
Net tonnage	17	35	340						13,995
Total vessels	2	3	19						378
Total net tonnage	17	35	340						16,092
Boats:									
Motor	59	12	376	28	45	66			1,478
Other			25	143	604	310	49		1,624
Accessory boats									942
Apparatus:									
Number	63	34	2,038	166	654	945	260		
Yards at mouth	31	44	1,895						

CATCH: BY GEAR

Species	Purse seines				Haul seines	
	Mackerel		Other			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	442,300	$3,711			199,000	$1,990
Bluefish					1,000	100
Butterfish	6,155	390				
Eels, common					90,000	2,700
Herring, sea	11,500	91			5,000	50
King whiting or "kingfish"	13,000	390				
Launce			21,000	$420		
Mackerel	27,133,285	648,853			20,000	600
Rosefish	2,175	17				
Shad	12,420	188			22,500	1,125
Sharks	84	1				
Striped bass					4,500	675
Tuna or "horse mackerel"	301	30				
White perch					48,500	7,100
Total	27,621,220	653,671	21,000	420	390,500	14,340

Species	Gill nets					
	Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	25	$1				
Bluefish			21,400	$2,860	22,000	$1,760
Butterfish	300	15	500	25		
Cod	2,993,283	69,964	92,000	1,600		
Flounders	6,665	275				
Grayfish			4,000	40		
Haddock	766,330	17,157	11,500	300		
Hake	279,990	4,796				
Herring, sea			5,000	50		
Mackerel			2,253,705	68,286		
Pollock	2,060,935	27,367				
Rosefish	55	1				
Sea bass					250	15
Shad	1,242	57	21,200	344		
Sharks	1,490	45				
Wolffish	12,820	139				
Total	6,123,135	119,817	2,409,305	73,505	22,250	1,775

Fisheries of Massachusetts, 1933—Continued

CATCH: By gear—Continued

Species	Lines						Pound nets		Floating traps	
	Hand		Trawl		Troll					
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Alewives							27,906	$284	8,825	$88
Amberjack							2,275	68		
Bluefish	359,000	$35,248			1,500	$250	19,691	2,253	475	51
Bonito							5,204	232	18	1
Butterfish	10,010	501	100	$4			715,700	34,081	33,948	1,697
Cod	2,025,138	39,389	32,812,743	601,079			3,225	84	51,420	1,286
Cusk	46,753	564	4,004,062	47,262						
Eels:										
Common	1,150	72					7,179	431		
Conger							597	30		
Flounders	18,000	808	381,325	12,437			18,486	740	210	8
Frigate mackerel							52,239	2,090		
Grayfish							5,580	56		
Haddock	279,405	6,667	30,481,801	756,794						
Hake	25,280	323	4,401,359	70,510						
Halibut	2,613	306	1,863,422	176,926						
Herring, sea							1,141,890	12,136	149,045	1,640
Mackerel	70,000	2,100					3,542,314	46,604	1,729,884	21,342
Menhaden							334	4		
Mullet							10	1		
Pollock	300,457	2,118	1,597,967	17,019			108,610	987	9,416	86
Rosefish			6,800	136			40	1		
Salmon									45	9
Scup or porgy	226,300	4,814					110,783	3,398	3,049	92
Sea bass	90,500	3,825					2,172	110		
Shad							5,099	257	107	5
Sharks	60	1	342	3			27,264	117	30	1
Skates			20,000	200			2,840	29		
Skipper or billfish							4,110	41		
Spot							985	30		
Squeteagues or "sea trout", spotted							2,048	204		
Striped bass	3,200	320					240	36		
Sturgeon							825	148	64	10
Tautog	123,700	4,820					46,085	1,803	155	6
Tuna or "horse mackerel"							251,976	13,671	1,795	180
White perch							286	9		
Whiting							6,413,067	64,131	1,252,695	12,527
Wolffish	7,397	146	408,150	5,813						
Lobsters							11	2		
Squid							482,145	6,081	33,201	664
Total	3,588,963	102,022	75,978,071	1,688,183	1,500	250	13,001,216	190,149	3,274,382	39,693

Species	Weirs		Fyke nets		Dip nets		Push nets		Otter trawls	
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Alewives					235,000	$2,125				
Bluefish									4,974	$360
Butterfish	26,165	$1,308							158,707	7,884
Cod	4,117	107							51,228,435	974,951
Croaker									2,491,145	35,716
Cunners									152	2
Cusk									458,189	5,940
Drum:										
Black									32	1
Red									1,755	32
Eels:										
Common			15,500	$930						
Conger									38,020	703
Flounders	225	9							26,762,516	864,324
Frigate mackerel	16,560	662								
Grayfish									2,932	36
Haddock									119,141,440	2,644,934
Hake									3,350,049	58,062
Halibut									535,257	53,237
Herring, sea	133,350	1,334			2,125,000	23,375			2,175	108
Herring smelt									11,618	313
King whiting or "kingfish"									25,296	645
Mackerel	800,205	8,002			50,000	1,500			11,970	821
Pigfish									3,832	73

Fisheries of Massachusetts, 1933—Continued

CATCH: BY GEAR—Continued

Species	Weirs		Fyke nets		Dip nets		Push nets		Otter trawls	
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Pollock	330	$3							7,914,083	$92,496
Rosefish									253,185	2,672
Scup or porgy	5,100	153							1,788,178	41,611
Sea bass									3,830,167	113,371
Sea robin									400	8
Shad	75	4							108	6
Sharks									4,878	119
Sheepshead									9	1
Skates									14,416	250
Spot									31,758	346
Squeteagues or "sea trout", gray									286,547	8,543
Striped bass					12,000	$2,900			17	1
Sturgeon									4,241	481
Swordfish									90	3
Tautog	2,915	117							688	20
Tuna or "horse mackerel"	2,100	105								
Whiting	669,150	6,692							342,830	5,298
Wolffish									1,668,202	25,236
Lobsters									1,719	163
Shrimp					300	125			40,900	2,045
Scallops:										
Bay							18,000	$7,000		
Sea									810	149
Squid	33,020	330							22,170	489
Total	1,693,312	18,826	15,500	$930	2,422,300	30,025	18,000	7,000	220,433,920	4,941,450

Species	Box traps		Pots							
			Crab		Eel		Lobster		Periwinkle and Cockle	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10,000	$200								
Eels, common					57,950	$3,477				
Crabs, hard			3,273,887	$15,843			1,832,628	$8,952		
Lobsters							1,926,886	381,484		
Periwinkles and cockles									62,100	$5,950
Total	10,000	200	3,273,887	15,843	57,950	3,477	3,759,514	390,436	62,100	5,950

Species	Harpoons		Spears		Dredges					
					Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			50,500	$3,117						
Swordfish	2,643,422	$324,814								
Tuna or "horse mackerel"	200	30								
Clams:										
Hard, public					471,900	$51,674				
Surf or skimmer					3,240	325				
Mussels, sea					30,000	3,000				
Oysters:										
Market, private, spring							29,762	$9,640		
Market, private, fall							43,198	13,292		
Scallops:										
Bay									481,575	$173,795
Sea									1,028,287	115,195
Total	2,643,622	324,844	50,500	3,117	505,140	54,999	72,960	22,932	1,509,862	288,990

Fisheries of Massachusetts, 1933—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Periwinkles and cockles									3, 600	$400
Clams:										
Hard, public	370, 750	$46, 487	890, 175	$113, 687	5, 100	$600	28, 600	$2, 600		
Hard, private	2, 200	400								
Razor					54, 400	2, 124	304, 000	13, 750		
Soft, public					2, 660, 090	228, 744	176, 000	16, 725		
Surf or skimmer			2, 700	150	42, 500	2, 500			10, 800	600
Oysters:										
Market, private, spring	45, 399	16, 040								
Market, private, fall	62, 250	21, 065								
Scallops, bay			540	180						
Irish moss			11, 650	582						
Bloodworms					17, 759	28, 000				
Sandworms					21, 656	19, 500				
Total	480, 599	83, 992	905, 065	114, 599	2, 801, 505	281, 468	508, 600	33, 075	14, 400	1, 000

OPERATING UNITS: BY COUNTIES

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	158	225	59	1, 736	95			1, 698
On boats and shore:								
Regular	761	248	241	633	62	71	251	514
Casual	266	91	330	372	150	159	182	102
Total	1, 185	564	630	2, 741	307	230	433	2, 314
Vessels:								
Steam								13
Net tonnage								2, 097
Motor	30	31	10	132	20			142
Net tonnage	363	786	137	5, 519	256			6, 934
Total vessels	30	31	10	132	20			155
Total net tonnage	363	786	137	5, 519	256			9, 031
Boats:								
Motor	341	148	197	322	105	46	183	136
Other	479	152	222	406	50	26	242	47
Accessory boats	48	32	22	530	2			308
Apparatus:								
Purse seines:								
Mackerel	4	2		62				29
Length, yards	1, 720	240		30, 140				13, 620
Other	2							
Length, yards	260							
Haul seines	2		1	5	6		1	
Length, yards	55		400	475	700		25	
Gill nets:								
Anchor				704				
Square yards				280, 655				
Drift	1, 070	45	45	2, 070	5	6	14	850
Square yards	304, 360	18, 900	24, 500	824, 740	2, 250	1, 520	6, 240	348, 450
Runaround	1							
Square yards	1, 800							
Lines:								
Hand	105	104	39	170	30	10	10	37
Hooks	135	208	39	194	30	10	10	45
Trawl	3, 640	200	280	22, 067	60		480	21, 109
Hooks	186, 500	7, 200	11, 800	1,095,124	2, 100		17, 280	1,060,058
Troll	8							
Hooks	8							
Pound nets	62	14	7		3			
Floating traps	4			13				
Weirs	4							
Fyke nets	20	4						
Dip nets	15			66		2	17	30
Push nets			50					
Otter trawls	52	32	22	72	22			166
Yards at mouth	1, 338	1, 063	573	2, 247	640			15, 223
Box traps							3	
Pots:								
Crab				45		204	41	805
Eel	495	118	320	115	450		67	
Lobster	6, 557	4, 882	12, 743	17, 479	1, 116	2, 903	13, 966	5, 501
Periwinkle and cockle	580			200			155	

Fisheries of Massachusetts, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Harpoons	17	25	18	49	3			14
Spears	76	19	6	20	12	14	38	
Dredges:								
Clam	25	16	6		9		3	4
Yards at mouth	10	7	3		5		2	4
Oyster	14						20	
Yards at mouth	24						20	
Scallop	276	197	830	2	638		95	
Yards at mouth	258	212	738	7	595		85	
Tongs	46	76			15		29	
Rakes	358	65	109		35		87	
Forks	26	6		579		160	11	163
Hoes	129					30	101	

CATCH: BY COUNTIES

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	314,000	$2,540	4,506	$50	4,400	$44	396,350	$3,568
Amberjack	2,275	68						
Bluefish	329,795	33,507	6,306	884	23,065	2,911	3,926	287
Bonito	1,183	40	526	21	3,178	159	18	1
Butterfish	597,693	28,256	41,395	2,093	100,482	5,025	112,644	5,105
Cod	2,167,492	47,329	2,075,929	37,125	120,002	2,968	22,437,126	421,879
Croaker	17,512	323	48,215	1,123	468	8	2,105,090	29,324
Cunners							152	2
Cusk	142,772	1,275	1,208	19	345	3	1,767,972	21,176
Drum:								
Black							32	1
Red			175	2			1,580	30
Eels:								
Common	67,230	4,034	17,299	1,063	16,200	972	101,500	3,345
Conger	70	1	3,216	83			26,772	514
Flounders	3,022,419	67,661	5,686,867	186,812	954,170	24,753	3,432,129	122,896
Frigate mackerel	68,799	2,752						
Grayfish	9,580	96					2,932	36
Haddock	2,046,138	48,745	6,862,729	169,075	31,740	808	22,444,944	527,084
Hake	276,526	3,088	60,624	907			2,699,382	42,669
Halibut	8,407	1,004	24,408	2,332			1,618,750	154,589
Herring, sea	1,353,786	14,255	27,054	271	200	2	485,745	7,113
King whiting or "kingfish"	732	32	300	8	115	2	34,981	937
Launce	21,000	420						
Mackerel	6,068,862	93,525	115,267	2,395	90,700	1,949	21,160,924	499,090
Menhaden	159	2	175	2				
Mullet			10	1				
Pigfish							3,654	68
Pollock	259,680	2,448	22,927	284	220	1	4,065,136	48,730
Rosefish	6,500	130			40	1	33,830	299
Salmon							45	9
Scup or porgy	43,143	1,209	305,821	6,302	70,635	2,119	1,401,941	33,881
Sea bass	37,116	1,232	187,741	6,092	6,215	311	3,108,326	88,458
Sea robin			400	8				
Shad	4,877	246	106	5	19	1	57,265	1,716
Sharks	516	5	26,748	112			4,070	92
Sheepshead							9	1
Skates	1,150	12	2,340	24	500	5	108	2
Skipper or "billfish"	4,110	41						
Smelt							100	5
Spot			985	30			16,265	202
Squeteagues or "sea trout":								
Gray	1,021	49	4,119	192			216,709	6,507
Spotted	97	9	1,644	164	307	31		
Striped bass	4,500	675	240	36			12,017	2,901
Sturgeon	541	92	218	15	64	8	2,602	337
Swordfish	276,476	25,864	269,473	25,194	266,837	24,700	1,533,102	210,700
Tautog	34,757	1,212	119,732	4,770	8,211	328	803	25
Tuna or "horse mackerel"	254,076	13,776					2,296	240
White perch			286	9	3,500	350		
Whiting	7,552,908	75,533	309	4			795,020	8,240
Wolffish	96,640	909	16,687	216			262,675	4,117
Crabs, hard							477,187	3,013
Lobsters	124,432	31,954	85,159	14,648	225,987	43,047	680,241	130,866
Shrimp	300	125			40,900	2,045		
Periwinkles and cockles	32,400	3,200					6,300	700

Fisheries of Massachusetts, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	704,385	$38,602	510,590	$64,685	154,000	$16,05		
Hard, private	2,200	40						
Razor	240,000	11,25					54,400	$2,124
Soft, public	77,5[illegible]0	9,36	3,740	440			1,892,200	173,157
Surf or skimmer	3,240	325			2,700	150	42,500	2,500
Oysters:								
Market, private, spring	65,963	22,88						
Market, private, fall	85,738	28,35						
Scallops:								
Bay	66,945	21,74	14,310	5,565	248,850	96,850		
Sea	170,594	20,61	528,157	57,937	175,050	19,450	52,854	5,891
Squid	457,746	5,718	44,370	563	13,039	130	50,222	1,000
Bloodworms							2,544	4,000
Sandworms							4,778	4,300
Total	27,125,981	717,05	17,152,311	591,561	2,562,139	245,181	93,612,148	2,573,727

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			20,000	$200	175,000	$1,935	8,800	$62
Bluefish	31,379	$3,155					35,569	2,138
Bonito	317	12						
Butterfish	21,561	983					77,810	4,443
Cod	916,378	16,458	13,800	360	115,000	3,000	61,364,634	1,159,341
Croaker							319,860	4,938
Cusk							2,596,707	31,293
Eels:								
Common	3,000	270	2,150	132	14,900	911		
Conger	1,351	15					7,208	120
Flounders	3,217,196	95,856	3,000	150	4,600	230	10,867,046	380,243
Haddock	1,608,930	40,965			17,250	600	117,668,745	2,638,575
Hake	16,519	257					5,003,627	86,770
Halibut							749,727	72,544
Herring, sea					200,000	2,000	1,506,175	15,143
Herring smelt							2,630	74
King whiting or "kingfish"							2,168	56
Mackerel	17,135	514	6,000	180	21,000	480	8,131,475	199,935
Pigfish							178	5
Pollock	11,154	204			1,650	15	7,631,031	88,394
Rosefish	500	5					221,385	2,392
Scup or porgy	51,223	991			1,500	45	259,147	5,521
Sea bass	96,651	2,797					487,040	18,401
Shad	172	9					312	9
Sharks							2,814	78
Skates							33,158	436
Smelt							8,918	234
Spot							15,493	144
Squeteagues or "sea trout", gray	142	11					64,556	1,784
Striped bass	3,200	320						
Sturgeon	284	56					1,421	131
Swordfish	83,722	6,976					213,902	31,383
Tautog					10,000	400	40	1
White perch	45,000	6,750						
Whiting							329,505	4,871
Wolffish							1,720,567	26,092
Crabs, hard			117,050	1,075	145,037	1,072	4,367,241	19,635
Lobsters	8,358	2,356	114,137	23,993	551,702	109,296	138,600	25,489
Periwinkles and cockles					27,000	2,450		
Clams:								
Hard, public	200,750	24,662	28,600	2,600	138,200	18,449		
Razor					64,000	2,500		
Soft, public			365,500	21,500	113,900	9,325	383,250	31,687
Surf or skimmer					10,800	600		
Mussels, sea							30,000	3,000
Oysters:								
Market, private, spring					9,198	2,800		
Market, private, fall					19,710	6,000		
Scallops:								
Bay	165,600	55,200			4,410	1,620		
Sea	102,060	11,340					382	77
Squid	100	2					5,059	151
Irish moss					11,650	582		
Bloodworms			11,400	18,000			3,815	6,000
Sandworms			11,100	10,000			5,778	5,200
Total	6,602,682	270,164	692,737	78,190	1,656,507	164,310	224,265,773	4,866,790

RHODE ISLAND

Fisheries of Rhode Island, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets, drift	Lines				Pounds nets
	Mackerel	Menhaden			Hand	Trawl	Troll	Trot with hooks	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11	20		3	28	4			13
On boats and shore:									
Regular			28	3	77	24	22		35
Casual			37	2	35		2	1	16
Total	11	20	65	8	140	28	24	1	64
Vessels:									
Steam		1							
Net tonnage		45							
Motor	2			1	13	2			3
Net tonnage	12			13	98	17			29
Total vessels	2	1		1	13	2			3
Total net tonnage	12	45		13	98	17			29
Boats:									
Motor				2	83	12	22		1
Other			26	1	13			1	38
Accessory boats	1	2							7
Apparatus:									
Number	2	1	20	44	248	51	48	1	64
Length, yards	420	400	2,512						
Square yards				17,800					
Hooks, baits or snoods					319	24,700	48	200	

Item	Floating traps	Fyke nets	Otter trawls	Pots			Harpoons	Spears
				Eel	Lobster	Periwinkle and cockle		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	111		103		21		72	
On boats and shore:								
Regular	34	4	34	21	162	23	26	3
Casual	1	3	6	19	128	12	2	10
Total	146	7	143	40	311	35	100	13
Vessels:								
Steam	4		5					
Net tonnage	45		55					
Motor	7		33		10		22	
Net tonnage	77		292		69		185	
Total vessels	11		38		10		22	
Total net tonnage	122		347		69		185	
Boats:								
Motor	1	4	23	21	203	27	14	
Other	21	1		13	26			12
Accessory boats	37						27	
Apparatus:								
Number	40	37	61	1,693	53,672	1,585	36	13
Yards at mouth			1,635					

Fisheries of Rhode Island, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges				Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
	Clam	Mussel	Oyster	Scallop						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	7		63							328
On boats and shore:										
Regular	17	1		78	107	25	4	3	12	371
Casual	5			34	436	50	4	23	16	677
Total	29	1	63	112	543	75	8	26	28	1,376
Vessels:										
Steam			2							8
Net tonnage			101							201
Motor	2		13							65
Net tonnage	18		249							695
Total vessels	2		15							73
Total net tonnage	18		350							896
Boats:										
Motor	10	1		70	162	24	1	1	1	433
Other					365	47	6	11		506
Accessory boats										74
Apparatus:										
Number	12	1	30	374	543	75	8	26		
Yards at mouth	9	1	45	324						

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets, drift	
	Mackerel		Menhaden					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					160,000	$1,600		
Bluefish					16,250	1,040	19,375	$1,240
Eels, common					16,599	1,280		
Herring, sea	30,000	$300			162,000	1,620		
Mackerel	37,500	1,350					30,000	600
Menhaden			1,000,000	$2,500				
Mullet					6,000	180		
Smelt					2,000	200		
Squeteagues or "sea trout", gray					8,750	560	2,500	160
Striped bass					2,800	280		
Tautog					3,000	90		
Thimble-eyed mackerel	45,000	675						
Total	112,500	2,325	1,000,000	2,500	377,399	6,850	51,875	2,000

Species	Lines							
	Hand		Trawl		Troll		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	2,875	$184			34,500	$2,048		
Cod	610,425	10,682	164,500	$2,693				
Eels, common	3,638	295					2,400	$360
Flounders	4,000	320						
Haddock			6,250	250				
Mackerel					4,300	129		
Sea bass	13,350	1,003						
Squeteagues or "sea trout", gray	1,750	112						
Striped bass	2,900	290						
Tautog	125,550	3,895						
Thimble-eyed mackerel	460	9						
Tuna or "horse mackerel"					21,467	483		
Total	764,948	16,790	170,750	2,943	60,267	2,660	2,400	360

Fisheries of Rhode Island, 1933—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Floating traps		Fyke nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	16, 000	$315						
Bluefish	13, 969	660	107, 417	$5, 634				
Bonito	5, 938	208	40, 334	1, 715				
Butterfish	178, 366	5, 495	308, 156	10, 709				
Cod	133	3	128, 183	3, 277			5, 000	$80
Crevalle			2, 200	81				
Cunners			7, 440	111			34, 000	310
Eels:								
Common	49, 994	3, 761			2, 700	$200		
Conger	643	23	315	6				
Flounders	69, 110	2, 324	301, 242	10, 139	1, 225	37	2, 877, 500	78, 110
Frigate mackerel	2, 640	26	54, 014	1, 583				
Grayfish			600	12				
Haddock			718	28			17, 000	425
Hake	171	3	9, 000	180				
Herring, sea	212, 746	3, 327	109, 860	1, 135			222, 400	5, 085
Hickory shad	2, 008	20	300	3				
King whiting or "kingfish"	1, 115	39	325	14				
Mackerel	171, 363	5, 568	476, 126	14, 490				
Menhaden	120	1	3, 396	34				
Mullet	11	1	2, 800	140				
Pollock	785	21	16, 457	430				
Scup or porgy	123, 578	2, 337	1, 878, 853	34, 783			17, 000	313
Sea bass	2, 938	108	31, 977	1, 432				
Sea robin	4, 175	41	69, 110	646			500	10
Shad	3, 174	398	7, 586	740				
Sharks			1, 947	28				
Skates			8, 410	83			168, 000	1, 245
Skipper or "billfish"			730	11				
Smelt	2, 250	225						
Spot			45	1				
Squeteagues or "sea trout", gray	18, 686	1, 136	31, 624	2, 044				
Striped bass	2, 110	99	31, 422	1, 749				
Sturgeon			449	37				
Swordfish			352	14				
Tautog	98, 371	2, 314	33, 902	914	6, 300	189		
Thimble-eyed mackerel	18, 192	637	14, 055	212				
Tomcod	200	1						
Tuna or "horse mackerel"	2, 018	63	21, 092	938				
White perch	711	39	150	3				
Whiting	162, 567	1, 626	338, 664	3, 905			223, 275	2, 095
Crabs, king	6, 574	18						
Periwinkles and cockles							272	4
Squid	52, 259	1, 189	396, 867	8, 697			52, 725	1, 732
Total	1, 222, 915	32, 026	4, 436, 162	105, 961	10, 225	426	3, 617, 672	89, 439

Species	Pots						Harpoons		Spears	
	Eel		Lobster		Periwinkle and cockle					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	63, 627	$5, 466							6, 653	$751
Swordfish							259, 358	$23, 785		
Crabs, hard			20, 478	$369						
Lobsters			708, 095	113, 933						
Periwinkles and cockles					109, 170	$5, 197				
Total	63, 627	5, 466	728, 573	114, 302	109, 170	5, 197	259, 358	23, 785	6, 653	751

Species	Dredges							
	Clam		Mussel		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	75, 625	$8, 594						
Hard, private	24, 200	3, 300			64, 845	$8, 949		
Mussels, sea			650	$38				
Oysters:								
Market, private, spring					1, 525, 104	211, 688		
Market, private, fall					1, 526, 635	211, 807		
Scallops, bay							63, 120	$12, 943
Total	99, 825	11, 894	650	38	3, 116, 584	432, 444	63, 120	12, 943

Fisheries of Rhode Island, 1933—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	858, 560	$100, 554	128, 601	$15, 036			4, 950	$713	1, 155	$150
Soft, public					10, 320	$1, 578	22, 064	2, 636		
Oysters:										
Market, public, spring			26, 880	3, 840						
Market, public, fall	7, 242	1, 051	27, 699	3, 957					3, 503	499
Market, private, spring	280	60								
Market, private, fall	420	90								
Total	866, 502	101, 755	183, 180	22, 833	10, 320	1, 578	27, 014	3, 349	4, 658	649

OPERATING UNITS: BY COUNTIES

Item	Bristol	Kent	Newport	Providence	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	26	3	257	24	18
On boats and shore:					
Regular	17	88	144	10	112
Casual	93	249	157	108	70
Total	136	340	558	142	200
Vessels:					
Steam			6	2	
Net tonnage			100	101	
Motor	7	1	48	2	7
Net tonnage	107	11	418	82	77
Total vessels	7	1	54	4	7
Total net tonnage	107	11	518	183	77
Boats:					
Motor	36	122	175	12	88
Other	67	197	67	105	70
Accessory boats			74		
Apparatus:					
Purse seines:					
Mackerel			2		
Length, yards			420		
Menhaden			1		
Length, yards			400		
Haul seines	2	3		9	6
Length, yards	100	225		667	1, 520
Gill nets, drift			42		2
Square yards			15, 300		2, 500
Lines:					
Hand	4		172	11	61
Hooks	8		213		98
Trawl			43		8
Hooks			20, 700		4, 000
Troll			16		32
Hooks			16		32
Trot with hooks				1	
Hooks				200	
Pound nets	1		45	1	17
Floating traps			30		10
Fyke nets	11	26			
Otter trawls			45		16
Yards at mouth			1, 211		424
Pots:					
Eel	90	343	430	145	690
Lobster	2, 805	4, 565	36, 662	585	9, 055
Periwinkle and cockle	500		490		595
Harpoons	1		32		3
Spears	1			10	2
Dredges:					
Clam		3	9		
Yards at mouth		1	8		
Mussel	1				
Yards at mouth	1				
Oyster	14	2		8	6
Yards at mouth	21	3		12	9
Scallop		259	61	6	48
Yards at mouth		230	48	5	41
Tongs	84	293	26	97	43
Rakes		40	13	1	21
Forks	2				6
Hoes	7	4	2	7	6

Fisheries of Rhode Island, 1933—Continued

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10,000	$75							166,000	$1,840
Bluefish					129,641	$6,662			64,745	4,144
Bonito					46,212	1,914			110	9
Butterfish					424,513	14,305			62,009	1,899
Cod	2,312	37			776,160	14,227			129,769	2,471
Crevalle					2,200	81				
Cunners					41,440	451				
Eels:										
Common	2,983	175	11,815	$890	58,964	3,902	37,382	$3,985	34,467	3,161
Conger					958	29				
Flounders	400	10	925	28	2,604,467	73,901			647,285	16,991
Frigate mackerel					56,294	1,598			360	11
Grayfish					600	12				
Haddock					23,968	703				
Hake					9,171	183				
Herring, sea					527,486	8,922			209,520	2,515
Hickory shad					2,308	23				
King whiting or "kingfish"					1,440	53				
Mackerel					696,810	21,621			22,479	516
Menhaden					1,000,200	2,502			3,310	33
Mullet					2,811	141			6,000	180
Pollock					17,092	449			150	2
Scup or porgy					1,948,671	35,737			70,760	1,696
Sea bass					45,505	2,345			2,760	198
Sea robin					64,955	653			8,830	44
Shad	2,475	299			7,489	729	650	95	146	15
Sharks					600	18			1,347	10
Skates					139,620	1,110			36,790	218
Skipper or "billfish"					730	14				
Smelt									4,250	425
Spot									45	1
Squeteagues or "sea trout", gray					14,041	929			49,269	3,083
Striped bass					30,067	1,501			9,165	917
Sturgeon					449	37				
Swordfish	775	118			234,268	21,461			24,667	2,220
Tautog	5,850	161	6,300	189	140,163	3,608			114,810	3,444
Thimble-eyed mackerel					76,957	1,518			750	15
Tomcod					200	1				
Tuna or "horse mackerel"					44,577	1,484				
White perch					411	19	450	23		
Whiting					696,416	7,354			28,090	272
Crabs:										
Hard	10,478	189			10,000	180				
King					6,574	18				
Lobsters	31,127	4,981	33,011	5,942	459,246	70,238	2,484	397	182,227	32,375
Clams:										
Hard, public	102,399	12,513	635,844	72,213	115,126	13,083	112,661	12,823	102,861	14,415
Hard, private	60,170	8,205	28,875	4,014						
Soft, public	14,720	1,653	1,984	186	1,600	200	7,440	930	6,640	1,245
Mussels, sea	650	38								
Oysters:										
Market, public, spring									26,880	3,840
Market, public, fall			6,903	1,004					31,541	4,503
Market, private, spring	864,738	129,259	60,000	7,500			429,258	50,485	171,388	24,504
Market, private, fall	695,177	104,936	60,000	7,500			429,257	50,485	342,621	48,976
Periwinkles and cockles	28,620	1,840			40,772	1,692			40,050	1,669
Scallops, bay			47,250	9,844	10,920	2,274	630	105	4,320	720
Squid					338,161	8,044			163,690	3,574
Total	1,832,874	264,489	892,907	109,340	10,850,253	325,926	1,020,212	119,328	2,770,101	182,181

Fisheries of Rhode Island, 1933—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Tongs		By hand		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen, on boats and shore:	*Number*		*Number*		*Number*	
Regular	1		4		5	
Casual	1		6		6	
Total	2		10		11	
Boats, other than motor	2		--------		2	
Apparatus, number	2		--------		--------	
CATCH	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Oysters, seed, public, spring	169	$135	826	$364	995	$499

SEED OYSTER FISHERY: BY COUNTIES

Item	Bristol		Kent	
OPERATING UNITS				
Fishermen, on boats and shore:	*Number*		*Number*	
Regular	3		2	
Casual	1		5	
Total	4		7	
Boats, other than motor	--------		2	
Apparatus, tongs	--------		2	
CATCH	*Bushels*	*Value*	*Bushels*	*Value*
Oysters, seed, public, spring	629	$206	366	$293

NOTE.—Of the total number of persons fishing for seed oysters, 9 are duplicated among those fishing for market oysters or other species. The 2 tongs also are duplicated.

CONNECTICUT

Fisheries of Connecticut, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Fyke nets	Dip nets	Otter trawls
		Anchor	Drift	Hand	Trawl				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	49	15	--------	--------	--------	112
On boats and shore:									
Regular	--------	2	--------	140	8	11	--------	10	93
Casual	66	--------	70	30	--------	--------	2	109	--------
Total	66	2	70	219	23	11	2	119	205
Vessels:									
Motor	--------	--------	--------	7	1	--------	--------	--------	41
Net tonnage	--------	--------	--------	161	47	--------	--------	--------	515
Boats:									
Motor	1	2	31	98	4	5	--------	--------	48
Other	15	--------	16	--------	--------	5	1	86	--------
Accessory boats	--------	--------	--------	--------	24	--------	--------	--------	--------
Apparatus:									
Number	12	2	43	405	800	9	4	119	89
Length, yards	1,668	--------	--------	--------	--------	--------	--------	--------	--------
Square yards	--------	1,680	12,360	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	--------	2,373
Hooks, baits or snoods	--------	--------	--------	443	35,680	--------	--------	--------	--------

Fisheries of Connecticut, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pots		Harpoons	Spears	Dredges		Tongs	Rakes	Hoes	Total, exclusive of duplication
	Eel	Lobster			Oyster	Scallop				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		9	73		115	8				307
On boats and shore:										
Regular	21	205	3	9	2		16		4	360
Casual	12	51	6	33			102	71	34	494
Total	33	265	82	42	117	8	118	71	38	1,161
Vessels:										
Steam					3					3
Net tonnage					581					581
Motor		4	13		16	1				67
Net tonnage		30	189		401	55				1,056
Total vessels		4	13		19	1				70
Total net tonnage		30	189		982	55				1,637
Boats:										
Motor	11	201	3		1		2			294
Other	22	35		28			75	33	25	276
Accessory boats			15							39
Apparatus:										
Number	1,289	17,212	16	42	43	2	118	71	38	
Yards at mouth					65	7				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines			
			Anchor		Drift		Hand		Trawl	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					162	$2				
Bluefish			1,500	$150			292,351	$21,695		
Cod							23,200	696	80,200	$2,559
Croaker							3,000	90		
Eels, conger									1,000	100
Haddock									3,150	142
Hake									500	10
Halibut									6,000	300
Scup or porgy							16,000	800		
Sea bass							23,695	1,620		
Shad	43,478	$3,166			88,732	7,669				
Smelt	2,240	224								
Squeteagues or "sea trout", gray			750	75			940	94		
Striped bass							750	75		
Tautog							33,933	1,485		
Tilefish									207,000	10,330
Total	45,718	3,390	2,250	225	88,894	7,671	393,869	26,555	289,850	13,441

Species	Pound nets		Fyke nets		Dip nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	15,000	$150						
Bluefish	2,490	204					113	$9
Butterfish	12,425	586					3,516	178
Cod							44,525	1,202
Croaker							2,738	46
Drum, black							100	1
Eels:								
Common	450	34	400	$40			190	4
Conger							400	20
Flounders	3,850	205					6,172,188	175,763
Haddock							32,300	876
Hake							581	10
Halibut							63	10
King whiting or "kingfish"							451	12

Fisheries of Connecticut, 1933—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Fyke nets		Dip nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mackerel							870	$27
Menhaden	25,250	$252						
Scup or porgy							25,987	859
Sea bass							3,920	223
Sea robin							3,250	33
Shad					1,070	$134		
Skates							18,550	185
Spot							50	1
Squeteagues or "sea trout", gray	17,500	1,550					320	17
Striped bass	1,500	150						
Sturgeon							44	5
Suckers			1,000	$60				
Tautog	4,600	222					2,425	81
Whiting							16,775	547
Wolffish							4,100	41
Crabs, hard					400	25		
Lobsters							163	20
Scallops:								
Bay					57,500	10,000		
Sea							126	26
Squid	2,425	37					480	13
Total	85,490	3,390	1,400	100	58,970	10,159	6,334,225	180,209

Species	Pots				Harpoons		Spears	
	Eel		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	25,469	$2,191					20,885	$1,695
Swordfish					154,235	$16,650		
Tautog			2,140	$107				
Lobsters			336,637	64,115				
Total	25,469	2,191	338,777	64,222	154,235	16,650	20,885	1,695

Species	Dredges				Tongs		Rakes		Hoes	
	Oyster		Scallop							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public					51,910	$10,796	41,645	$8,329	8,050	$1,610
Soft, public									13,683	1,953
Oysters:										
Market, public, spring					10,150	1,250				
Market, public, fall					11,550	1,450				
Market, private, spring	605,447	$80,083			8,100	1,300				
Market, private, fall	1,208,511	167,811			15,150	2,450				
Scallops, sea			55,800	$6,200						
Total	1,813,958	247,894	55,800	6,200	96,860	17,246	41,645	8,329	21,733	3,563

Fisheries of Connecticut, 1933—Continued

OPERATING UNITS: BY COUNTIES

Item	Fairfield	Hartford	Middlesex	New Haven	New London
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	99			60	148
On boats and shore:					
Regular	56		76	59	169
Casual	163	61	113	20	137
Total	318	61	189	139	454
Vessels:					
Steam	2			1	
Net tonnage	187			394	
Motor	17			13	37
Net tonnage	421			172	463
Total vessels	19			14	37
Total net tonnage	608			566	463
Boats:					
Motor	42	2	80	42	128
Other	95	16	48	19	98
Accessory boats					39
Apparatus:					
Haul seines	3	8	1		
Length, yards	300	900	468		
Gill nets:					
Anchor					2
Square yards					1,680
Drift		2	30		11
Square yards		560	8,680		3,120
Lines:					
Hand	72		116	65	152
Hooks	100		116	65	162
Trawl					800
Hooks					35,680
Pound nets					9
Fyke nets		4			
Dip nets		7	20		92
Otter trawls	13		4	10	62
Yards at mouth	330		100	237	1,706
Pots:					
Eel	115		264	338	572
Lobster	5,007		2,843	2,814	6,548
Harpoons	1			1	14
Spears	20			5	17
Dredges:					
Oyster	27			16	
Yards at mouth	40			25	
Scallop	2				
Yards at mouth	7				
Tongs	82		32		4
Rakes	71				
Hoes			10	10	18

CATCH: BY COUNTIES

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					162	$2			15,000	$150
Bluefish	12,759	$993			36,057	3,138	18,949	$1,597	228,689	16,330
Butterfish									15,941	764
Cod	2,000	60			540	16			145,385	4,381
Croaker	3,000	90					222	2	2,516	44
Drum, black									100	1
Eels:										
Common	18,333	1,498	400	$40	3,240	324	3,810	381	21,611	1,721
Conger									1,400	120
Flounders	196,578	5,441			28,540	704	112,945	3,660	5,837,975	166,163
Haddock									35,450	1,018
Hake	275	5							806	15
Halibut									6,063	310
King whiting or "kingfish"									451	12
Mackerel									870	27
Menhaden									25,250	252
Scup or porgy	32,220	1,329							9,767	330
Sea bass	11,150	762			1,215	74	220	13	15,030	994
Sea robin									3,250	33

Fisheries of Connecticut, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Shad			44,148	$3,275	67,502	$5,531			21,630	$2,163
Skates									18,550	185
Smelt	2,240	$224								
Spot	50	1								
Squeteagues or "sea trout", gray	58	4			940	94	10	$1	18,502	1,637
Striped bass									2,250	225
Sturgeon							27	3	17	2
Suckers			1,000	60						
Swordfish	20,500	1,968					2,260	130	131,475	14,552
Tautog	8,231	453			13,274	656	1,191	72	20,402	714
Tilefish									207,000	10,330
Whiting									16,775	547
Wolffish									4,100	41
Crabs, hard									400	25
Lobsters	53,211	10,635			46,011	9,202	62,565	12,513	175,013	31,785
Clams:										
Hard, public	88,455	17,691			5,100	1,434	8,050	1,610		
Soft, public					8,400	1,200	1,500	150	3,783	603
Oysters:										
Market, public, spring					10,150	1,250				
Market, public, fall					11,550	1,450				
Market, private, spring	356,972	47,633			2,100	300	248,475	32,450	6,000	1,000
Market, private, fall	569,317	79,394			3,150	450	639,194	88,417	12,000	2,000
Scallops:										
Bay					11,500	2,000			46,000	8,000
Sea	55,800	6,200							126	26
Squid	415	12							2,490	38
Total	1,431,564	174,393	45,548	3,375	249,431	27,825	1,099,418	140,999	7,052,067	266,538

SEED OYSTER FISHERY: BY GEAR

Item	Dredges, oyster		Tongs		Rakes		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	93						93	
On boats and shore, casual	14		94		46		154	
Total	107		94		46		247	
Vessels:								
Steam	3						3	
Net tonnage	245						245	
Motor	18						18	
Net tonnage	271						271	
Sail	2						2	
Net tonnage	17						17	
Total vessels	23						23	
Total net tonnage	533						533	
Boats:								
Motor	7						7	
Other			60		28		88	
Apparatus:								
Number	101		94		46			
Yards at mouth	97							
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	23,463	$9,385	5,200	$2,080	1,800	$720	30,463	$12,185
Seed, public, fall	23,663	9,465	16,900	6,760	2,600	1,040	43,163	17,265
Seed, private, spring	207,185	69,617					207,185	69,617
Total	254,311	88,467	22,100	8,840	4,400	1,760	280,811	99,067

Fisheries of Connecticut, 1933—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Fairfield		New Haven	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	51		42	
On boats and shore, casual	150		4	
Total	201		46	
Vessels:				
Steam	2		1	
Net tonnage	140		105	
Motor	10		8	
Net tonnage	113		158	
Sail	2			
Net tonnage	17			
Total vessels	14		9	
Total net tonnage	270		263	
Boats:				
Motor	5		2	
Other	88			
Apparatus:				
Dredges	75		26	
Yards at mouth	64		33	
Tongs	94			
Rakes	46			
CATCH				
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	26,863	$10,745	3,600	$1,440
Seed, public, fall	39,563	15,825	3,600	1,440
Seed, private, spring	74,817	41,099	132,368	28,518
Total	141,243	67,669	139,568	31,398

NOTE.—Of the total number of persons fishing for seed oysters, 126 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 78 boats other than motor, 80 tongs, and 46 rakes.

VESSEL FISHERIES AT PRINCIPAL NEW ENGLAND PORTS

Due to the importance of the ports of Boston and Gloucester, Mass., and Portland, Maine, as landing points for fishery products, detailed monthly statistics are collected for these landings which are published in the following section. These landings are included in the catch by States appearing elsewhere in this document, but also are presented here for their value in detailed form.

ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Maine) by vessels of 5 net tons capacity or more, during 1933 amounted to 267,157,218 pounds as landed, valued at $6,850,901. This is an increase of 6 percent in the quantity of the catch as compared with 1932, and an increase of 13 percent in the value of the catch. Of the total landings 99 percent consisted of fresh fish and 1 percent salted fish. The landings at Boston accounted for 232,583,049 pounds, valued at $6,093,604, or 87 percent of the total landings. The landings at Gloucester amounted to 21,736,997 pounds, valued at $441,937, or 8 percent of the total. Landings at Portland amounted to 12,837,172 pounds, valued at $315,360, or 5 percent of the total landings.

Among the landings of fresh fish, haddock far outranked other species in volume landed, the amount of all sizes in 1933 being 129,847,257 pounds, or 49 percent of the total fresh fish.

Landings by fishing vessels at the 3 principal New England ports, 1933

BOSTON: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	2, 585, 139	$55, 765	4, 079, 855	$79, 391	4, 638, 620	$123, 961	2, 907, 927	$48, 245	1, 873, 315	$31, 875	1, 449, 898	$39, 203	1, 759, 068	$41, 125
Market	1, 700, 490	38, 482	1, 762, 390	43, 506	2, 247, 765	57, 831	3, 015, 715	37, 841	2, 435, 900	31, 572	1, 952, 585	37, 552	4, 369, 380	75, 054
Scrod	27, 270	483	12, 250	192	4, 115	94	900	9	2, 100	22	11, 050	172	23, 250	383
Cod, salted:														
Large	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9, 000	207	11, 000	305
Market	-----	-----	-----	-----	-----	-----	-----	-----	11, 000	253	3, 500	46	-----	-----
Haddock, fresh:														
Large	6, 623, 185	234, 991	8, 521, 960	268, 389	9, 645, 690	333, 564	11, 661, 785	175, 953	9, 600, 536	161, 449	7, 310, 335	177, 536	7, 818, 740	183, 996
Scrod	1, 561, 565	38, 608	1, 966, 970	49, 726	1, 751, 360	48, 940	1, 999, 220	20, 050	1, 710, 785	19, 910	1, 364, 580	24, 194	1, 642, 450	27, 792
Hake, fresh:														
Large	757, 165	15, 680	298, 540	8, 633	122, 430	4, 780	181, 640	3, 985	173, 925	2, 359	237, 575	4, 132	123, 110	1, 688
Small	16, 000	344	10, 760	338	9, 800	330	3, 775	106	37, 950	569	19, 630	401	83, 190	1, 359
Pollock, fresh	1, 216, 725	16, 835	484, 225	10, 233	305, 715	7, 718	895, 735	5, 649	674, 095	5, 049	256, 270	3, 339	376, 990	4, 902
Cusk, fresh	416, 510	6, 083	330, 736	5, 159	108, 325	2, 044	205, 330	1, 809	119, 905	1, 021	143, 575	1, 562	113, 540	1, 439
Halibut, fresh	38, 476	7, 481	119, 622	15, 143	209, 685	21, 403	180, 140	24, 278	270, 191	27, 357	207, 918	17, 851	269, 122	25, 869
Mackerel, fresh	1, 155	93	120	1	-----	-----	-----	-----	3, 632, 163	56, 165	2, 169, 695	67, 426	2, 353, 943	52, 084
Flounders, fresh	761, 390	36, 663	729, 510	31, 617	531, 250	28, 067	587, 000	23, 582	1, 059, 400	20, 769	789, 940	18, 714	710, 304	22, 565
Swordfish, fresh	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	162, 493	40, 679	464, 176	89, 585
Herring, fresh	775	39	75	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Other, fresh	135, 895	5, 674	119, 487	3, 368	223, 703	5, 826	336, 323	4, 818	550, 349	6, 354	299, 632	3, 527	165, 385	2, 751
Total, fresh	15, 841, 740	457, 221	18, 436, 500	515, 698	19, 798, 458	634, 558	21, 975, 490	346, 325	22, 140, 614	364, 471	16, 375, 176	436, 288	20, 272, 648	530, 592
Total, salted	-----	-----	-----	-----	-----	-----	-----	-----	11, 000	253	12, 500	253	11, 000	305
Grand total	15, 841, 740	457, 221	18, 436, 500	515, 698	19, 798, 458	634, 558	21, 975, 490	346, 325	22, 151, 614	364, 724	16, 387, 676	436, 541	20, 283, 648	530, 897
Landed in 1932:														
Fresh	14, 621, 426	472, 864	18, 685, 804	660, 364	19, 220, 853	592, 393	19, 552, 627	320, 842	19, 773, 187	389, 166	17, 046, 277	418, 749	18, 353, 142	388, 315
Salted	-----	-----	-----	-----	-----	-----	11, 000	165	10, 000	300	24, 000	741	1, 150	25
Total	14, 621, 426	472, 864	18, 685, 804	660, 364	19, 220 853	592, 393	19, 563, 627	321, 007	19, 783, 187	389, 466	17, 070, 277	419, 490	18, 354, 292	388, 340

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2½ to 10 pounds; and scrod cod, 1 to 2½ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake, under 6 pounds. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

Species	August		September		October		November		December		Total, 1933		1932	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	1,596,001	$43,864	1,267,174	$41,283	1,933,240	$56,712	1,961,566	$62,806	1,910,170	$57,404	27,961,973	$681,634	21,445,174	$586,706
Market	4,103,189	69,330	2,292,725	53,983	3,028,470	70,792	2,909,520	81,077	3,207,700	77,077	33,025,829	674,097	26,917,646	474,635
Scrod	4,150	51	29,680	546	52,410	947	11,870	174	16,900	320	195,945	3,393	101,015	1,737
Cod, salted:														
Large					30,500	1,028					50,500	1,540	47,815	1,518
Market					1,000	30					15,500	329	32,360	587
Haddock, fresh:														
Large	7,487,140	201,163	6,516,290	205,917	7,114,815	234,421	4,520,533	217,142	3,532,885	170,781	90,353,894	2,565,392	87,083,975	2,368,147
Scrod	2,506,795	44,422	6,141,240	123,543	5,582,620	95,954	2,987,710	71,558	3,316,565	75,016	32,531,860	639,713	27,649,754	399,352
Haddock, salted, large	400	4									400	4		
Hake, fresh:														
Large	264,590	4,025	478,948	8,984	517,255	10,009	846,435	20,723	682,000	15,436	4,683,613	100,434	5,647,501	111,176
Small	54,200	948	85,800	1,958	102,800	2,212	75,640	1,833	38,100	933	537,645	11,331	19,000	318
Hake, salted, small													4,000	80
Pollock, fresh	427,420	5,334	320,050	4,552	752,000	9,920	1,297,615	17,549	1,254,710	14,781	8,261,580	105,861	5,775,443	70,602
Pollock, salted	50										50		7,300	73
Cusk, fresh	55,720	674	245,180	4,177	272,400	4,580	207,850	4,292	279,505	5,450	2,498,576	38,290	2,492,595	38,187
Halibut, fresh	128,409	13,256	115,446	12,674	108,803	12,335	58,663	7,274	49,189	6,091	1,755,661	191,612	2,084,176	239,176
Mackerel, fresh	4,197,145	80,304	2,003,641	50,638	2,520,690	72,943	276,110	14,770	193,455	7,886	17,348,117	402,310	25,274,474	460,214
Mackerel, salted			9,800	147							9,800	147		
Flounders, fresh	800,445	27,413	888,336	36,831	807,865	33,069	896,472	42,487	716,630	27,336	9,278,542	349,113	6,796,804	274,679
Swordfish, fresh	529,335	73,748	512,176	74,158	12,749	3,500	375	24			1,681,304	281,694	2,257,522	315,092
Herring, fresh	1,100	11			675	27	830	17	650	40	4,195	136	7,540	99
Other, fresh	100,496	3,648	62,509	2,686	191,930	3,751	116,485	3,047	85,958	1,814	2,388,152	47,264	1,974,925	45,156
Total, fresh	22,256,135	568,191	20,959,195	621,930	22,998,722	611,172	16,167,704	544,773	15,284,417	460,365	232,506,799	6,091,584	215,527,504	5,364,667
Total, salted	450	4	9,800	147	31,500	1,058					76,250	2,020	91,475	2,258
Grand total	22,256,585	568,195	20,968,995	622,077	23,030,222	612,230	16,167,704	544,773	15,284,417	460,365	232,583,049	6,093,604	215,618,979	5,366,925
Landed in 1932:														
Fresh	20,830,781	430,596	20,573,161	420,414	20,461,179	396,038	14,176,025	452,927	12,233,042	421,999			215,527,504	5,364,667
Salted	17,180	185			15,000	510	9,145	252	4,000	80			91,475	2,258
Total	20,847,961	430,781	20,573,161	420,414	20,476,179	396,548	14,185,170	453,179	12,237,042	422,079			215,618,979	5,366,925

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

GLOUCESTER: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	156, 450	$3, 897	396, 240	$7, 546	408, 540	$9, 770	1, 089, 505	$19, 940	1, 723, 450	$30, 380	379, 490	$10, 053	306, 700	$6, 174
Market	15, 695	250	21, 555	391	21, 930	445	240, 680	2, 457	366, 030	3, 903	100, 475	1, 006	126, 960	1, 274
Scrod	1, 455	14	460	7	5, 290	81	660	4	3, 665	19			650	5
Cod, salted:														
Large							2, 750	70	193, 904	4, 764	40, 330	1, 009	688, 712	20, 661
Market							2, 290	46	94, 892	1, 423	12, 292	185	266, 458	5, 329
Scrod									15, 585	156			80, 835	607
Haddock, fresh:														
Large	58, 575	2, 402	37, 965	1, 211	80, 635	3, 109	1, 096, 165	19, 639	767, 420	13, 385	15, 215	228	76, 765	1, 180
Scrod	2, 350	34	1, 430	24	1, 360	26	43, 650	332	6, 460	41	55	1	11, 720	89
Hake, fresh, large	55, 145	1, 108	19, 285	474	11, 190	374	10, 690	180	12, 115	81	1, 740	13	7, 609	50
Hake, salted, large											30	1	1, 325	13
Pollock, fresh	122, 790	1, 792	58, 895	1, 479	25, 100	815	48, 530	272	23, 675	119	11, 110	95	5, 075	27
Pollock, salted							90	1						
Cusk, fresh	1, 940	24	1, 930	27	3, 565	71	104, 740	362	29, 885	189	25, 195	189	21, 220	145
Halibut, fresh			39	8	24	2			1, 315	169	2, 807	217		
Halibut, salted									130	7				
Mackerel, fresh									462, 220	3, 439	103, 515	2, 327	261, 100	4, 637
Mackerel, salted													4, 400	264
Flounders, fresh	59, 265	2, 046	75, 680	2, 420	50, 180	2, 026	47, 350	1, 107	15, 900	240	21, 860	491	19, 020	438
Herring, fresh											11, 500	91		
Other, fresh	5, 510	53	7, 150	91	8, 065	188	4, 170	102	490	4	715	6	12, 170	143
Total, fresh	479, 175	11, 620	620, 629	13, 678	615, 879	16, 907	2, 686, 140	44, 395	3, 412, 625	51, 969	673, 677	14, 717	848, 989	14, 162
Total, salted							5, 130	117	304, 511	6, 350	52, 652	1, 195	1, 041, 730	26, 874
Grand total	479, 175	11, 620	620, 629	13, 678	615, 879	16, 907	2, 691, 270	44, 512	3, 717, 136	58, 319	726, 329	15, 912	1, 890, 719	41, 036
Landed in 1932:														
Fresh	356, 379	13, 520	457, 680	21, 320	773, 065	22, 126	2, 126, 060	37, 088	2, 015, 490	31, 081	1, 546, 305	25, 391	2, 550, 828	29, 019
Salted									255, 480	8, 312	118, 070	3, 429	303, 304	8, 454
Total	356, 379	13, 520	457, 680	21, 320	773, 065	22, 126	2, 126, 060	37, 088	2, 270, 970	39, 393	1, 664, 375	28, 820	2, 854, 132	37, 473

Species	August		September		October		November		December		Total, 1933		1932	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	143, 905	$2, 390	291, 885	$11, 338	521, 575	$17, 739	65, 100	$2, 161	51, 770	$1, 906	5, 534, 610	$123, 294	4. 883, 161	$126, 270
Market	113, 008	1, 131	17, 565	186	181, 225	4, 313	55, 185	1, 177	44, 165	751	1, 304, 473	17, 284	1, 813. 670	18, 113
Serod	----------	--------	200	2	3, 150	60	205	3	475	6	16, 210	201	3, 120	24
Cod, salted:														
Large	349, 857	10, 374	110. 439	3, 720	147, 436	5, 777	----------	--------	----------	--------	1, 533, 428	46, 375	660, 265	20, 242
Market	263, 296	5, 266	91, 848	2, 266	162, 623	4, 866	----------	--------	----------	--------	893, 699	19, 381	415. 559	9, 865
Serod	98, 041	1, 225	18, 859	283	22, 357	447	----------	--------	----------	--------	235, 677	2, 718	121, 965	1, 347
Haddock, fresh:														
Large	103, 325	1, 668	22, 615	894	115, 909	4, 630	77, 790	2, 911	13, 295	695	2, 465, 674	51, 952	2, 212, 557	46, 726
Serod	1, 715	16	5, 000	68	11, 920	266	750	5	3, 395	35	89, 805	937	218, 085	1, 752
Haddock, salted, serod	----------	--------	----------	--------	----------	--------	----------	--------	2, 450	12	2, 450	12	----------	--------
Hake, fresh:														
Large	14, 050	127	45, 815	971	199, 708	3, 528	56, 185	1, 344	42, 510	898	476, 042	9. 148	1, 029, 151	9. 311
Small	----------	--------	----------	--------	9, 170	127	2, 635	77	----------	--------	11, 805	204	----------	--------
Hake, salted, large	----------	--------	----------	--------	----------	--------	----------	--------	----------	--------	1, 355	14	1, 045	14
Pollock, fresh	27, 945	267	356, 205	6, 027	739, 857	9, 990	1, 320, 055	18, 289	658, 875	8, 381	3, 398, 112	47, 553	1, 174, 950	9, 644
Pollock, salted	----------	--------	----------	--------	----------	--------	----------	--------	----------	--------	90	1	1, 295	13
Cusk, fresh	68, 085	450	11, 995	80	4, 580	62	2, 390	42	3, 340	57	278, 865	1, 698	236, 857	1. 702
Cusk, salted	944	12	440	7	----------	--------	----------	--------	----------	--------	1, 384	19	4, 000	57
Halibut, fresh	----------	--------	----------	--------	----------	--------	95	14	----------	--------	4, 280	410	162, 320	11, 787
Halibut, salted	----------	--------	----------	--------	----------	--------	----------	--------	----------	--------	130	7	840	59
Mackerel, fresh	745, 590	11, 535	1, 071, 156	16, 498	868, 627	20, 636	340, 001	17, 405	128, 335	4, 812	3. 980, 544	81, 289	11, 031, 008	138, 343
Mackerel, salted	----------	--------	40, 000	800	11, 600	406	----------	--------	----------	--------	56, 000	1, 470	23, 225	696
Flounders, fresh	8, 360	200	12, 855	583	12, 540	531	15, 415	719	38, 485	1, 793	376, 910	12, 594	415, 995	14, 980
Swordfish, fresh	----------	--------	771	110	----------	--------	----------	--------	----------	--------	771	110	7, 032	789
Herring, fresh	----------	--------	----------	--------	----------	--------	----------	--------	----------	--------	11, 500	91	21, 000	210
Herring, salted	----------	--------	----------	--------	----------	--------	----------	--------	703, 494	21, 290	703, 494	21, 290	655, 700	20, 130
Other, fresh	207, 200	2, 051	94, 700	750	7, 412	220	6, 112	223	5, 995	54	359, 689	3, 885	235, 413	2, 062
Total, fresh	1, 433, 183	19, 835	1, 930, 762	37, 507	2, 675, 673	62, 102	1, 941, 918	44, 370	990, 640	19, 388	18, 309, 290	350, 650	23, 444, 319	381, 713
Total, salted	712, 138	16, 877	261, 586	7, 076	344, 016	11, 496	----------	--------	705, 944	21, 302	3, 427, 707	91, 287	1, 883, 894	52, 363
Grand total	2, 145, 321	36, 712	2, 192, 348	44, 583	3, 019, 689	73, 598	1, 941, 918	44, 370	1, 696, 584	40, 690	21, 736, 997	441, 937	25. 328, 213	434, 076
Landed in 1932:														
Fresh	3, 467, 071	39, 047	3, 984, 238	56, 620	4, 161, 740	44, 647	1, 190, 792	34, 613	814. 671	27, 241	----------	--------	23, 444, 319	381, 713
Salted	97, 925	2, 958	332, 560	7, 321	255, 655	6, 814	----------	--------	520, 900	15, 075	----------	--------	1, 883, 894	52, 363
Total	3, 564, 996	42, 005	4, 316, 798	63, 941	4, 417, 395	51, 461	1, 190, 792	34, 613	1, 335, 571	42, 316	----------	--------	25, 328, 213	434, 076

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

PORTLAND: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	72,965	$1,855	70,442	$1,746	156,490	$3,976	233,387	$2,954	237,627	$3,143	339,113	$8,439	386,421	$9,271
Market	37,304	570	38,033	740	71,730	1,369	113,710	1,139	90,475	914	80,498	1,321	124,741	2,421
Scrod	3,423	26	1,580	15	1,040	10	2,165	11	320	1	270	1	425	2
Cod, salted:														
Large									21,645	555	13,460	336		
Market									3,800	75	6,230	125		
Haddock, fresh:														
Large	196,729	9,170	224,685	8,683	306,669	10,684	557,723	7,340	697,212	9,671	233,433	6,521	680,487	15,525
Scrod	6,482	81	5,767	71	2,476	24	1,320	8	257	1	78,675	1,494	188,784	3,668
Haddock, salted:														
Large											9,900	248		
Scrod											1,615	24		
Hake, fresh:														
Large	3,030	58	500	10	145	4			20		10		3,965	29
Small	184,240	2,841	96,693	1,929	72,515	1,543	99,773	1,769	102,044	878	79,200	870	123,165	1,386
Hake, salted, large									1,675	17				
Pollock, fresh	50,832	341	32,585	396	57,001	721	24,285	98	36,602	148	80,685	393	52,802	347
Pollock, salted														
Cusk, fresh	79,184	1,225	65,146	1,193	89,885	1,589	113,155	1,032	96,380	729	1,876	26	873	14
Cusk, salted									330	3				
Halibut, fresh	394	59	216	27	67	10	32,252	3,551	93,313	6,982	86,402	8,451	24,769	2,798
Halibut, salted									1,985	90				
Mackerel, fresh									10,350	214	25,995	412	391,588	3,639
Flounders, fresh	29,219	908	35,773	998	93,508	3,841	26,525	567	40,017	485	98,691	1,194	93,483	1,897
Swordfish, fresh											15,861	3,423	53,899	9,099
Herring, fresh											4,200	32	28,400	250
Other, fresh	26,464	592	14,978	446	15,476	464	2,451	33	2,566	30	17,986	188	46,237	382
Total, fresh	690,266	17,726	586,398	16,254	867,002	24,235	1,206,746	18,502	1,407,183	23,196	1,142,895	32,765	2,200,039	50,728
Total, salted									29,435	740	31,205	733		
Grand total	690,266	17,726	586,398	16,254	867,002	24,235	1,206,746	18,502	1,436,618	23,936	1,174,100	33,498	2,200,039	50,728
Landed in 1932:														
Fresh	584,943	17,884	515,287	17,952	844,076	23,264	1,676,850	25,482	788,605	11,812	730,969	23,183	1,072,120	32,923
Salted							1,850	41	5,455	148	3,395	95	556	16
Total	584,943	17,884	515,287	17,952	844,076	23,264	1,678,700	25,523	794,060	11,960	734,364	23,278	1,072,676	32,939

Species	August		September		October		November		December		Total, 1933		1932	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	300,398	$9,783	219,249	$9,146	93,106	$3,087	48,200	$1,613	49,330	$1,488	2,206,728	$56,531	2,507,439	$72,657
Market	98,562	1,916	26,859	501	34,635	642	28,035	613	29,330	716	773,912	12,862	567,519	8,002
Scrod	290	1	2,885	18	1,815	11	2,665	22	1,985	21	18,863	139	23,932	176
Cod, salted:														
Large	25,571	792			430	15					61,106	1,698	6,306	205
Market	3,135	66			160	3					13,325	269	3,805	87
Scrod													90	2
Haddock, fresh:														
Large	567,743	14,161	156,206	7,760	153,209	7,568	102,578	5,570	86,890	4,906	3,963,564	107,559	2,882,137	90,213
Scrod	131,655	2,572	10,471	98	6,318	45	6,668	84	3,587	58	412,460	8,204	70,366	618
Haddock, salted:														
Large											9,900	248		
Scrod											1,615	21		
Hake, fresh:														
Large	68,205	817	143,056	2,184	217,722	3,704	126,640	2,633	73,738	1,791	637,031	11,230	195,436	3,551
Small	76,505	609	3,575	24	6,940	46	1,450	12	1,293	14	847,393	11,921	848,531	12,138
Hake, salted:														
Large											1,675	17		
Small													455	4
Pollock, fresh	133,556	815	133,008	910	45,335	377	48,492	520	40,332	334	735,515	5,400	890,639	5,354
Pollock, salted													615	3
Cusk, fresh	30,045	235	28,043	450	70,822	1,145	42,069	837	33,693	773	651,171	9,218	335,388	5,817
Cusk, salted											330	3	160	2
Halibut, fresh	110,623	9,967	24,784	2,293	1,171	116	1,670	210	967	140	376,628	34,601	108,533	10,191
Halibut, salted											1,985	90	195	6
Mackerel, fresh	353,476	3,352	163,824	2,180	56,398	2,224	10,297	460			1,011,928	12,481	1,677,321	18,563
Mackerel, salted	30,100	396	8,000	80							38,100	476	99,500	591
Flounders, fresh	79,559	2,106	39,913	1,507	10,017	386	5,443	203	30,883	710	583,031	14,802	230,034	5,858
Swordfish, fresh	79,780	10,631	6,299	1,032							155,839	24,185	339,361	41,052
Herring, fresh	20,000	100	90,400	380							143,000	762	71,000	355
Other, fresh	4,928	43	24,778	211	1,702	46	4,015	80	492	92	162,073	2,607	537,371	7,405
Total, fresh	2,055,325	57.108	1,073,350	28,694	699,190	19,397	428,222	12,887	352,520	11,043	12,709,136	312,535	11,285,007	281,950
Total, salted	58,806	1,254	8,000	80	590	18					128,036	2,825	102,126	900
Grand total	2,114,131	58,362	1,081,350	28,774	699,780	19,415	428,222	12.887	352,520	11,043	12,837,172	315,360	11,387,133	282,850
Landed in 1932:														
Fresh	1,576,395	42,849	1,694,588	36,828	679,803	17,840	538,505	16,607	582,866	15,326			11,285,007	281.950
Salted	55,000	413	35,500	178			370	9					102,126	900
Total	1,631,395	43,262	1,730,088	37,006	679,803	17,840	538,875	16,616	582,866	15,326			11,387,133	282,850

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland		Total, 1933		1932	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:										
Large	27,961,973	$681,634	5,534,610	$123,294	2,206,728	$56,531	35,703,311	$861,459	28,835,774	$785,633
Market	33,025,829	674,097	1,304,473	17,284	773,912	12,862	35,104,214	704,243	29,298,835	480,150
Scrod	195,945	3,393	16,210	201	18,863	139	231,018	3,733	128,067	1,937
Cod, salted:										
Large	50,500	1,540	1,533,428	46,375	61,106	1,698	1,645,034	49,613	714,386	21,965
Market	15,500	329	893,699	19,381	13,325	269	922,524	19,979	451,724	10,479
Scrod	-----	-----	235,677	2,718	-----	-----	235,677	2,718	122,055	1,349
Haddock, fresh:										
Large	90,353,894	2,565,302	2,465,674	51,952	3,963,564	107,559	96,783,132	2,724,813	92,178,669	2,505,086
Scrod	32,531,860	639,713	89,805	937	442,460	8,204	33,064,125	648,854	27,938,205	401,722
Haddock, salted:										
Large	400	4	-----	-----	9,900	248	10,300	252	-----	-----
Scrod	-----	-----	2,450	12	1,615	24	4,065	36	-----	-----
Hake, fresh:										
Large	4,683,613	100,434	476,042	9,148	637,031	11,230	5,796,686	120,812	6,872,088	124,038
Small	537,645	11,331	11,805	204	847,393	11,921	1,396,843	23,456	867,531	12,456
Hake, salted:										
Large	-----	-----	1,355	14	1,675	17	3,030	31	1,045	14
Small	-----	-----	-----	-----	-----	-----	-----	-----	4,455	84
Pollock, fresh	8,261,580	105,861	3,398,112	47,553	735,515	5,400	12,395,207	158,814	7,841,032	85,600
Pollock, salted	50	-----	90	1	-----	-----	140	1	9,210	89
Cusk, fresh	2,498,576	38,290	278,865	1,698	651,171	9,248	3,428,612	49,236	3,064,840	45,706
Cusk, salted	-----	-----	1,384	19	330	3	1,714	22	4,160	59
Halibut, fresh	1,755,664	191,012	4,280	410	376,628	34,604	2,136,572	226,026	2,355,029	261,154
Halibut, salted	-----	-----	130	7	1,985	90	2,115	97	1,035	65
Mackerel, fresh	17,348,117	402,310	3,980,544	81,289	1,011,928	12,481	22,340,589	496,080	37,982,803	617,120
Mackerel, salted	9,800	147	56,000	1,470	38,100	476	103,900	2,093	113,725	1,287
Flounders, fresh	9,278,542	349,113	376,910	12,594	583,031	14,802	10,238,483	376,509	7,442,833	295,517
Swordfish, fresh	1,681,304	281,694	771	110	155,839	24,185	1,837,914	305,989	2,603,915	356,933
Herring, fresh	4,105	136	11,500	91	143,000	762	158,605	989	99,500	655
Herring, salted	-----	-----	703,494	21,290	-----	-----	703,494	21,290	655,700	20,130
Other, fresh	2,388,152	47,264	359,689	3,885	162,073	2,607	[1] 2,909,914	53,756	2,747,709	54,623
Total, fresh	232,506,799	6,091,584	18,309,290	350,650	12,709,136	312,535	263,525,225	6,754,769	250,256,830	6,028,330
Total, salted	76,250	2,020	3,427,707	91,287	128,036	2,825	3,631,993	96,132	2,077,495	55,521
Grand total	232,583,049	6,093,604	21,736,997	441,937	12,837,172	315,360	267,157,218	6,850,901	252,334,325	6,083,851
Landed in 1932:										
Fresh	215,527,504	5,364,667	23,444,319	381,713	11,285,007	281,950	-----	-----	250,256,830	6,028,330
Salted	91,475	2,258	1,883,894	52,363	102,126	900	-----	-----	2,077,495	55,521
Total	215,618,979	5,366,925	25,328,213	434,076	11,387,133	282,850	-----	-----	252,334,325	6,083,851

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[1] The items under "Other, fresh" include alewives, 341,725 pounds, value $2,910; butterfish, 97,320 pounds, value $5,654; rosefish, 250,075 pounds, value $2,639; scup, 6,700 pounds, value $100; sea robins, 400 pounds, value $8; shad, 70,871 pounds, value $917; sharks, 21,363 pounds, value $313; skates, 10,308 pounds, value $208; smelt, 11,767 pounds, value $327; sturgeon, 1,822 pounds, value $178; tuna or "horse mackerel", 4,826 pounds, value $200; whiting, 137,340 pounds, value $3,191; wolffish, 1,814,264 pounds, value $30,470; lobsters, 259 pounds, value $58; scallops, 5,018 pounds, value $649; livers, 36,100 pounds, value $722; sounds, 350 pounds, value $14; spawn, 95,856 pounds, value $5,055; and mixed fish, 3,550 pounds, value $143.

BIOLOGICAL ASPECT

In 1933 the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Maine, and operating on the fishing banks of the North Atlantic numbered 390 steam, motor, and sail vessels of 5 net tons capacity or greater as measured by the United States Customs Service. These made 12,214 trips to the fishing grounds, and were absent from port 52,651 days, or an average of 4.3 days per trip. This is 0.1 of a day less than the average length of a trip during 1932. The catches of edible fish landed at the 3 ports amounted to 270,145,894 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as landed. This however does not represent the entire catch of edible fish of these vessels, for small quantities estimated at not more than 5 percent of their total catch were landed at ports in New England other than these three, at New York City, and at ports in New Jersey.

Otter trawls on all sizes of vessels accounted for 169,683,377 pounds, or 63 percent of the total landings. Line trawls were next in importance, accounting for 62,260,813 pounds, or 23 percent of the total landings.

The catch taken on Georges Bank and landed at the 3 ports amounted to 90,850,098 pounds, or 34 percent of the total; that on shore grounds, 45,602,905 pounds, or 17 percent; Browns Bank, 37,249,263 pounds, or 14 percent; Sable Island Bank, 30,415,492 pounds, or 11 percent; and South Channel, 27,617,824 pounds, or 10 percent. No other bank accounted for as much as 10,000,000 pounds in the landings at the 3 ports.

Landings by fishing vessels at the 3 principal New England ports, 1933

BY GEAR AND FISHING GROUNDS

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:										
Off Funks	1	1	14							
Grand Bank	6	13	283	122,871	24,501		20,394	3,392		
St. Peters Bank	2	2	31	3,700	7,740		8,400	425		
Off Newfoundland (Treaty Coast)	1	1	7	52,250	35,413					
Gulf of St. Lawrence	6	13	366	2,605,238	1,651,667	466,641			3,182	2,700
Quereau Bank	6	15	312	152,349	23,764				6,717	
The Gully	1	2	35	12,946	1,017					
Sable Island Bank (Western Bank)	21	35	528	706,595	595,330		913,375	29,900	34,590	5,175
Cape Shore	36	108	1,363	1,074,260	1,949,015	1,500	1,655,775	517,990	329,530	
Emerald Bank	8	9	85	101,040	115,575		252,800	20,825	13,545	
La Have Bank	23	51	618	942,705	929,094		1,225,550	90,650	134,875	
Roseway Bank	5	6	54	80,570	118,990		126,100	19,700	14,300	
Browns Bank	44	270	3,008	3,409,825	2,984,177	11,595	8,353,630	729,495	442,909	4,100
Georges Bank	46	160	1,562	2,916,335	1,184,478		3,447,125	197,810	158,293	300
Georges Bank (occasional)				54,790	6,600	740	10,700			
South Channel	33	193	1,488	1,441,952	1,703,218	2,350	4,084,004	172,290	568,425	
Off Highland Light	6	13	81	15,735	8,015		112,830	7,040	38,940	
Off Chatham	9	13	80	37,915	35,165	175	190,950	2,080	23,040	
Nantucket Shoals	3	5	52	19,470	58,400		14,200	1,300		
Cashes Bank	18	39	160	94,800	77,355	6,490	116,245	9,886	133,285	115,465
Fippenies Bank	13	23	101	48,160	27,025	620	109,395	17,172	99,180	750
Platts Bank	11	65	151	82,865	43,367	5,025	137,287	13,917	87,520	94,505
Jeffreys Ledge	17	149	312	83,605	47,693	4,080	327,984	16,666	135,478	138,915
Tillies Bank	1	1	12	190	70		8,600	700	1,400	
Middle Bank (Stellwagen Bank)	16	71	317	46,315	41,320	225	400,875	19,500	338,393	2,575
South	1	1	3	200	300		600			
Shore, general	89	863	2,174	647,501	471,443	28,140	1,368,550	40,618	499,500	353,564
Shore, general (occasional)				100	108		217			50
Total	[1] 135	2,122	13,197	14,754,282	12,140,840	527,581	22.885,586	1,911,356	3,063,102	718,099
Hand lines:										
Cape Shore	3	12	115	156,700	263,500		11,215		1,900	
Browns Bank	1	1	11	16,415	21,800		200			
Georges Bank	3	15	139	241,175	209,595		1,610		30	
South Channel	2	2	11	9,200	10,550		19,900	150	10,850	
Nantucket Shoals	3	8	74	31,355	45,625		100			

Shore, general	3	3	13	11, 130	14, 950		365		145	
Shore, general (occasional)				6, 047	2, 290	5				15
Total	1 9	41	363	472, 022	568, 310	5	33, 390	150	12, 925	15
Harpoons:										
Cape Shore	34	37	910							
Georges Bank	71	199	3, 834							
South Channel	1	1	30							
Nantucket Shoals	5	5	96							
Shore, general	9	11	152							
Total	1 74	253	5, 022							
Otter trawls, large:										
Gulf of St. Lawrence	1	3	35	12, 675	33, 900		85, 750	68, 600	55, 100	
Sable Island Bank (Western Bank)	50	238	2, 854	3, 500, 208	3, 974, 745	26, 680	6, 117, 125	10, 114, 270	374, 435	1, 000
Cape Shore	8	9	109	76, 240	99, 950		135, 370	198, 370	13, 870	
Emerald Bank	3	3	30	18, 750	49, 500	2, 800	139, 810	47, 700	8, 020	
La Have Bank	18	31	318	599, 990	922, 290	17, 920	2, 128, 620	542, 200	26, 365	
Browns Bank	42	137	1, 362	1, 907, 000	2, 571, 225	1, 350	7, 929, 270	2, 370, 395	88, 335	200
Georges Bank	46	672	6, 583	8, 238, 780	9, 509, 000	78, 100	29, 820, 990	11, 428, 905	690, 225	1, 400
South Channel	37	131	1, 146	769, 795	1, 069, 145	4, 700	6, 417, 273	1, 357, 050	353, 550	2, 010
Off Chatham	1	1	9	3, 800	20, 200		84, 200	43, 800	300	
Nantucket Shoals	2	2	23	4, 800	3, 400		81, 200	10, 600	2, 400	
Cashes Bank	1	1	3	13, 480	30, 800		79, 100	17, 900	700	
Shore, general	6	8	68	50, 800	139, 500		302, 200	182, 100	4, 280	
Total	1 52	1, 236	12, 540	15, 196, 318	18, 423, 655	131, 550	53, 320, 908	26, 381, 890	1, 617, 580	4, 610
Otter trawls, medium:										
Sable Island Bank (Western Bank)	13	29	342	318, 680	344, 950		460, 750	386, 410	38, 015	
Cape Shore	7	7	78	26, 030	96, 265		76, 350	96, 750	7, 290	
Emerald Bank	1	1	13	2, 380	6, 000		3, 600	6, 800	3, 000	
La Have Bank	6	11	124	154, 150	171, 425		198, 700	80, 100	5, 690	
Browns Bank	20	47	458	353, 000	435, 165		1, 472, 870	360, 825	22, 700	
Georges Bank	41	375	3, 401	1, 872, 835	1, 919, 510	3, 295	7, 183, 296	2, 373, 385	124, 775	80
Georges Bank (occasional)							21, 700			
South Channel	34	199	1, 613	372, 684	814, 285	2, 000	4, 346, 610	1, 054, 655	127, 685	
Off Highland Light	11	19	146	34, 395	20, 180		197, 950	25, 910	29, 225	
Off Chatham	15	67	511	175, 926	587, 370	1, 200	1, 090, 250	171, 740	75, 245	800
Nantucket Shoals	13	16	111	6, 740	57, 935	700	194, 820	47, 125	9, 910	
Middle Bank (Stellwagen Bank)	2	11	46	13, 455	14, 290		105, 865	4, 010	45, 305	
South	1	1	4							
Shore, general	46	528	1, 515	161, 080	288, 619	12, 655	1, 158, 665	79, 655	69, 595	111, 058
Total	1 77	1, 311	8, 362	3, 491, 355	4, 755, 994	19, 850	16, 511, 426	4, 687, 365	558, 435	111, 938

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Otter trawls, small:										
Georges Bank	3	5	31	850	5,500		26,565	6,000	1,550	
South Channel	2	14	100	8,595	66,300		260,780	42,950	2,550	
Off Chatham	2	2	11	735	29,300	300	13,990	1,700	400	
Nantucket Shoals	2	2	14		5,500		3,900	6,850		
Cashes Bank	1	1	9	1,200	1,500		23,500	9,000	300	
Fippenies Bank	1	1	6	1,530	440		2,225		4,500	
Shore, general	88	1,581	4,422	417,913	486,488	15,313	2,089,192	23,441	127,065	373,355
Total	[1] 90	1,606	4,593	430,823	595,028	15,613	2,420,152	89,941	136,365	373,355
Sink gill nets:										
Jeffreys Ledge	1	3	3	3,697	1,230		1,460			10
Shore, general	32	3,765	3,783	4,480,355	408,848	3,060	1,631,078	1,920	413,886	188,816
Total	[1] 32	3,768	3,786	4,484,052	410,078	3,060	1,632,538	1,920	413,886	188,826
Drift gill nets:										
Bay of Islands	2	2	122							
Sable Island Bank (Western Bank)	1	1	4							
Cape Shore	1	1	8							
Off Chatham	1	1	2							
Shore, general	60	356	733							
Total	[1] 62	361	869							
Purse seines:										
Gulf of St. Lawrence (occasional)										
Georges Bank	3	3	8							
Off Chatham	32	43	146							
Nantucket Shoals	11	12	52							
Middle Bank (Stellwagen Bank)	20	21	59							
South	48	70	240							
Shore, general	101	1,363	3,405	20	5		350	40	150	
Total	[1] 102	1,512	3,910	[2] 20	[2] 5		[2] 350	[2] 40	[2] 150	

Scallop drags:										
Georges Bank	1	1	6							
Shore, general	1	3	3							
Total	[1] 2	4	9							
Grand total	[1] 390	12,214	52,651	38,828,872	36,893,910	697,659	96,804,350	33,072,662	5,802,443	1,396,843

[1] Exclusive of duplication.

[2] Incidental catch.

NOTE.—The three principal New England ports are Boston and Gloucester, Mass., and Portland, Maine. Otter trawls (including V-D trawls) are classified according to the size of the vessel. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. "Occasional" after the name of a bank or ground indicates that the vessel or vessels contributing to the catch as shown fished chiefly with another type of gear. In such cases the number of vessels fishing, number of trips, and number of days absent are shown under the principal types of gear used.

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:									
Off Funks			26,171						26,171
Grand Bank			426,606						597,764
St. Peters Bank			52,032						72,297
Off Newfoundland (Treaty Coast)									87,663
Gulf of St. Lawrence		1,367	141,198	220					4,872,213
Quereau Bank		15,565	265,547		441				464,383
The Gully			51,196						65,159
Sable Island Bank (Western Bank)	20,085	84,230	142,706		662			350	2,532,998
Cape Shore	75,065	432,210	11,350	2,200				28,675	6,077,570
Emerald Bank	6,200	8,400	6,718					2,050	527,153
La Have Bank	34,120	199,610	46,935		1,573			14,440	3,619,552
Roseway Bank	6,050	21,290	2,972					1,375	391,347
Browns Bank	361,421	1,086,750	167,732	2,825	1,975			102,580	17,659,014
Georges Bank	157,005	202,330	225,873	2,075	2,493			8,135	8,502,252
Georges Bank (occasional)	3,620	430							76,880
South Channel	214,008	86,825	23,579	11,610	148	85		15,150	8,323,644
Off Highland Light	4,875	24,950	323	4,357				470	217,535
Off Chatham	12,965	3,150	1,118					3,755	310,313
Nantucket Shoals			12,230		176				105,776
Cashes Bank	23,355	173,190	2,191					2,783	755,045
Fippenies Bank	18,785	33,695	3,139					275	358,196
Platts Bank	33,675	164,600	2,188					11,414	676,363
Jeffreys Ledge	50,520	147,670	2,107					18,826	973,544
Tillies Bank	100	350	15						11,425
Middle Bank (Stellwagen Bank)	30,885	70,621	882					3,985	955,576
South	50	300							1,450
Shore, general	143,590	354,320	5,968	46,977		136		38,233	3,998,540
Shore, general (occasional)		10	5	500					990
Total	1,196,374	3,111,863	1,620,781	70,764	[2] 7,468	[2] 221		252,496	62,260,813

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
Hand lines:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Cape Shore	30, 300	11, 500	279					20, 705	496, 099
Browns Bank	1, 700	700						200	41, 015
Browns Bank (occasional)			232						232
Georges Bank	32, 200	9, 500	185					5, 030	499, 325
Georges Bank (occasional)			301						301
South Channel	1, 450	175	103	100					52, 478
Nantucket Shoals	3, 770		351					175	81, 376
Shore, general	630								27, 220
Shore, general (occasional)	30								8, 387
Total	70, 080	21, 875	1, 451	100				26, 110	1, 206, 433
Harpoons:									
Quereau Bank (occasional)					3, 930				3, 930
The Gully (occasional)					1, 216				1, 216
Sable Island Bank (Western Bank) (occasional)					1, 874				1, 874
Cape Shore					449, 247				449, 247
Cape Shore (occasional)					294				294
La Have Bank (occasional)					902				902
Browns Bank (occasional)					7, 306				7, 306
Georges Bank					1, 257, 907			3, 367	1, 261, 274
Georges Bank (occasional)					5, 160				5, 160
South Channel					12, 602				12, 602
Nantucket Shoals					42, 554				42, 554
Shore, general					46, 934			987	47, 921
Total					1, 829, 926			4, 354	1, 834, 280
Otter trawls, large:									
Gulf of St. Lawrence	470		3, 174	31, 950				385	292, 004
Sable Island Bank (Western Bank)	1, 396, 780	4, 405	128, 271	362, 045		1, 400		164, 435	26, 165, 799
Cape Shore	34, 730		1, 678	20, 775				7, 170	588, 153
Emerald Bank	12, 800	500	703	5, 300				5, 500	291, 383
La Have Bank	334, 300	11, 355	25, 472	45, 075				76, 525	4, 730, 112
Browns Bank	1, 105, 040	30, 130	79, 045	173, 400				344, 660	16, 600, 050
Georges Bank	2, 637, 875	161, 700	163, 853	1, 394, 045		3, 675	2, 605	595, 924	64, 727, 077
South Channel	540, 375	9, 955	33, 228	318, 634	300	325		180, 175	11, 056, 515
Off Chatham	900		206	9, 800					163, 206
Nantucket Shoals	1, 900			5, 700				1, 350	111, 350

Cashes Bank	16,650		230	1,075				240	159,575
Shore, general	10,100	100	2,453	8,775				9,802	710,110
Total	6,091,320	218,145	438,313	2,376,574	[2] 300	[2] 5,400	[2] 2,605	1,386,166	125,595,334
Otter trawls, medium:									
Sable Island Bank (Western Bank)	76,730		7,196	68,740				4,250	1,705,721
Cape Shore	5,275	7,200	2,487	8,100				1,800	327,547
Emerald Bank	1,200		116	2,400				250	25,746
La Have Bank	29,500	10,250	4,784	28,900				5,380	688,879
Browns Bank	139,120	13,500	11,256	58,085				75,125	2,941,646
Georges Bank	246,560	14,625	32,527	1,749,875	220	7,900	850	107,486	15,637,219
Georges Bank (occasional)			38						21,738
South Channel	146,530	3,135	12,931	753,611		1,150	650	127,723	7,763,649
Off Highland Light	236,600		133	22,350		300		5,410	572,453
Off Chatham	51,250		585	133,220		525		106,310	2,394,421
Nantucket Shoals	6,420			84,535		145		3,130	411,460
Middle Bank (Stellwagen Bank)	31,450	14,050	739	500				1,195	230,859
South								6,700	6,700
Shore, general	149,515	1,875	869	1,226,335				111,088	3,371,009
Total	1,120,150	64,635	73,661	4,136,651	[2] 220	[2] 10,020	[2] 1,500	555,847	36,099,047
Otter trawls, small:									
Georges Bank	150		765	37,280				785	79,445
South Channel	100		721	21,220				5,720	408,936
Off Chatham	370			4,010				430	51,235
Nantucket Shoals			13	23,330					39,593
Cashes Bank	400		157	2,700				500	39,257
Fippenies Bank	150	1,480							10,325
Shore, general	55,949	5,903	4,710	3,544,100				216,776	7,360,205
Total	57,119	7,383	6,366	3,632,640				224,211	7,988,996
Sink gill nets:									
Jeffreys Ledge	2,690	10						87	9,184
Shore, general	3,847,380	7,858	230	21,504		751		31,227	11,036,913
Total	3,850,070	7,868	230	21,504		[2] 751		31,314	11,046,097
Drift gill nets:									
Bay of Islands							1,055,241		1,055,241
Sable Island Bank (Western Bank)						9,100			9,100
Cape Shore						13,980			13,980
Off Chatham						600		900	1,500
Shore, general						980,030		1,723	981,753
Total						1,003,710	1,055,241	2,623	2,061,574

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[2] Incidental catch.

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
Purse seines:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Gulf of St. Lawrence (occasional)						54,000			54,000
Georges Bank						35,405			35,405
Off Chatham						716,238			716,238
Nantucket Shoals						214,885			214,885
Middle Bank (Stellwagen Bank)						323,775			323,775
South						2,645,138			2,645,138
Shore, general	10,360	100		250		17,471,311	154,500	422,375	18,059,461
Total	[2] 10,360	[2] 100		[2] 250		21,460,752	154,500	422,375	22,048,902
Scallop drags:									
Georges Bank								4,022	4,022
Shore, general								396	396
Total								4,418	4,418
Grand total	12,395,473	3,431,869	2,140,802	10,238,483	1,837,914	22,480,854	1,213,846	2,909,914	270,145,894

SUMMARY: BY FISHING GROUNDS

Fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
Off Newfoundland:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Area XVIII: Off Funks	1	1	14							
Area XIX:										
Bay of Islands	2	2	122							
Off Newfoundland (Treaty Coast)	1	1	7	52,250	35,413					
Area XX:										
Grand Bank	6	13	283	122,871	24,501		20,394	3,392		
St. Peters Bank	2	2	31	3,700	7,740		8,400	425		
Total	[1] 9	19	457	178,821	67,654		28,794	3,817		

Off Canada:										
Area XIX: Gulf of St. Lawrence	7	16	401	2,617,913	1,685,567	466,641	85,750	68,600	58,282	2,700
Area XXI:										
Quereau Bank	6	15	312	152,349	23,764				6,717	
The Gully	1	2	35	12,946	12,017					
Sable Island Bank (Western Bank)	84	303	3,728	4,525,483	4,915,025	26,680	7,491,250	10,539,580	447,440	6,175
Cape Shore	81	174	2,583	1,333,230	2,408,730	1,500	1,878,710	813,110	352,590	
Emerald Bank	12	13	128	122,170	171,075	2,800	396,210	75,325	24,565	
La Have Bank	45	93	1,060	1,696,845	2,022,809	17,920	3,552,870	712,950	166,530	
Roseway Bank	5	6	54	80,570	118,990		126,100	19,700	14,300	
Browns Bank	101	455	4,839	5,686,240	6,012,367	12,945	17,755,970	3,460,715	553,944	4,300
Total	[1] 149	1,077	13,140	16,227,746	17,359,344	528,486	31,286,860	15,680,980	1,624,368	13,175
Off United States:										
Area XXII:										
Georges Bank	187	1,430	15,564	13,324,765	12,834,683	82,135	40,511,986	14,006,100	974,873	1,780
South Channel	103	540	4,388	2,602,226	3,663,498	9,050	15,128,567	2,627,095	1,063,060	2,010
Off Highland Light	17	32	227	50,130	28,195		310,780	32,950	68,165	
Off Chatham	59	127	759	218,376	672,035	1,675	1,379,390	219,320	98,985	800
Nantucket Shoals	38	50	422	62,365	170,860	700	294,220	65,875	12,310	
Cashes Bank	20	41	172	109,480	109,655	6,490	218,845	36,786	134,285	115,465
Fippenies Bank	13	24	107	49,690	27,465	620	111,620	17,172	103,680	750
Platts Bank	11	65	151	82,865	43,367	5,025	137,287	13,917	87,520	94,505
Jeffreys Ledge	18	152	315	87,302	48,923	4,080	329,444	16,666	135,478	138,925
Tillies Bank	1	1	12	190	70		8,600	700	1,400	
Middle Bank (Stellwagen Bank)	36	103	422	59,770	55,610	225	506,740	23,510	383,698	2,575
Shore, general	279	8,481	16,268	5,774,946	1,812,251	59,173	6,550,617	327,774	1,114,621	1,026,858
Area XXIII: South	49	72	247	200	300		600			
Total	[1] 382	11,118	39,054	22,422,305	19,466,912	169,173	65,488,696	17,387,865	4,178,075	1,383,668
Grand total	[1] 390	12,214	52,651	38,828,872	36,893,910	697,659	96,801,350	33,072,662	5,802,443	1,396,843

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[1] Exclusive of duplication.

[2] Incidental catch.

NOTE.—The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. The roman numerals appearing in the stub of the above table refer to the numbers given these regions by the North American Council on Fishery Investigations.

Landings by fishing vessels at the 3 principal New England ports, 1933—Continued

SUMMARY: BY FISHING GROUNDS—Continued

Fishing grounds	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Off Newfoundland:									
Area XVIII: Off Funks			26, 171						26, 171
Area XIX:									
Bay of Islands							1, 055, 241		1, 055, 241
Off Newfoundland (Treaty Coast)									87, 663
Area XX:									
Grand Bank			426, 606						597, 764
St. Peters Bank			52, 032						72. 297
Total			504, 809				1, 055. 241		1, 839, 136
Off Canada:									
Area XIX: Gulf of St. Lawrence	470	1, 367	144, 372	32, 170		54, 000		385	5, 218, 217
Area XXI:									
Quereau Bank		15, 565	265, 547		4, 371				468, 313
The Gully			51, 196		1, 216				66, 375
Sable Island Bank (Western Bank)	1, 493, 595	88, 635	278, 173	430, 785	2, 536	10, 500		169, 035	30, 415, 492
Cape Shore	145, 370	450, 910	15, 794	31, 075	449, 541	13, 980		58, 350	7, 952, 890
Emerald Bank	20, 200	8, 900	7, 537	7, 700				7, 800	844, 282
La Have Bank	397, 920	221, 215	77, 191	73, 975	2, 475			96, 345	9, 039, 445
Roseway Bank	6, 050	21, 290	2, 972					1, 375	391, 347
Browns Bank	1, 607, 281	1, 131, 080	258, 265	234, 310	9, 281			522, 565	37, 249, 263
Total	3, 670, 886	1, 938, 962	1, 101, 047	810, 015	469, 420	78, 480		855, 855	91, 645, 624
Off United States:									
Area XXII:									
Georges Bank	3, 077, 410	388, 585	423, 542	3, 183, 275	1, 265, 780	46, 980	3, 155	724, 749	90, 850, 098
South Channel	902, 463	100, 090	70, 562	1, 105, 175	13, 050	1, 560	650	328, 768	27, 617, 824
Off Highland Light	241, 475	24, 950	456	26, 707		300		5, 880	789, 988
Off Chatham	65, 485	3, 150	1, 909	147, 030		717, 363		111, 395	3, 636, 913
Nantucket Shoals	12, 090		12, 594	113, 565	42, 730	215, 030		4, 655	1, 006, 994
Cashes Bank	39, 805	173, 190	2, 578	3, 775				3, 523	953, 877
Fippenies Bank	18, 935	35, 175	3, 139					275	368, 521
Platts Bank	33, 675	164, 600	2, 188					11, 414	676, 363
Jeffreys Ledge	53, 210	147, 680	2, 107					18, 913	982, 728
Tillies Bank	100	350	15						11, 425
Middle Bank (Stellwagen Bank)	62, 335	84, 671	1, 621	500		323, 775		5, 180	1, 510, 210
Shore, general	4, 217, 554	370, 166	14, 235	4, 848, 441	46, 934	18, 452, 228	154, 500	832, 607	45, 602, 905
Area XXIII: South	50	300				2, 645, 138		6, 700	2, 653, 288
Total	8, 724, 587	1, 492, 907	534, 946	9, 428, 468	1, 368, 494	22, 402, 374	158, 605	2, 054, 059	176, 661, 134
Grand total	12, 395, 473	3, 431, 869	2, 140, 802	10, 238, 483	1, 837, 914	22, 480, 854	1, 213, 846	2, 909, 914	270, 145, 894

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1933

Fishing grounds	January	February	March	April	May	June	July	August	September	October	November	December	Total
Off Newfoundland:													
Area XVIII: Off Funks								14					14
Area XIX:													
Bay of Islands												122	122
Off Newfoundland (Treaty Coast)							7						7
Area XX:													
Grand Bank			29	61	18	131	37	7					283
St. Peters Bank		21									10		31
Total		21	29	61	18	131	44	21			10	122	457
Off Canada:													
Area XIX: Gulf of St. Lawrence					109	32	117	54	44	31	14		401
Area XXI:													
Quereau Bank		20	43		69	24	21	62	73				312
The Gully			21					14					35
Sable Island Bank (Western Bank)	106	29	96	126	279	56	56	98	507	493	851	1,031	3,728
Cape Shore	90	41	6	9	54	65	86	128	940	192	466	506	2,583
Emerald Bank	8		8	12	13	8	22			26		31	128
La Have Bank	170	7	86	122	112	48	93	80	61	78	35	168	1,060
Roseway Bank	11	16								10		17	54
Browns Bank	538	671	540	1,115	749	245	188	49	42	236	185	281	4,839
Total	923	784	800	1,384	1,385	478	583	485	1,667	1,066	1,551	2,034	13,140
Off United States:													
Area XXII:													
Georges Bank	1,344	1,400	1,429	557	565	1,435	2,906	2,497	1,053	1,281	739	358	15,564
South Channel	246	228	347	216	480	658	290	671	587	216	361	88	4,388
Off Highland Light	53	27	8	5		8	12		6	4	41	63	227
Off Chatham	87	33	44	40	77	46	281	24	26	59	15	27	759
Nantucket Shoals	10		6	24	35	56	13	46	132	66	34		422
Cashes Bank	13	3	12	30	33				9	15	29	28	172
Fippenies Bank	22	14		2					3	13	13	40	107
Platts Bank	17	26	13	9					16	25	29	16	151
Jeffries Ledge	63	51	41	8					12	38	54	48	315
Tillies Bank		12											12
Middle Bank (Stellwagen Bank)	45	57	21			57	2		19	69	70	82	422
Shore, general	976	838	1,037	1,328	1,551	1,519	1,459	1,679	1,521	1,927	1,524	909	16,268
Area XXIII: South					247								247
Total	2,876	2,689	2,958	2,219	2,988	3,779	4,963	4,917	3,384	3,713	2,909	1,659	39,054
Grand total	3,799	3,494	3,787	3,664	4,391	4,388	5,590	5,423	5,051	4,779	4,470	3,815	52,651

NOTE.—The Roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

MACKEREL FISHERY OF THE ATLANTIC COAST[5]

That part of the 1933 mackerel catch taken by the purse seines and drift gill nets amounted to 29,532,600 pounds, a decrease of 37 percent as compared with corresponding statistics for the previous year. The decrease resulted mainly from voluntary curtailment of the fishery on the part of the purse-seine fleet. It is estimated that normal exploitation of the fishery would have produced an increase rather than a decrease in total catch in 1933 as compared with 1932.

The statistics in the following table were obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Maine, with those obtained by agents stationed at other ports where mackerel are landed. The figures include approximately 1,000,000 pounds of mackerel that were brought to port but not landed due to lack of market. The statistics include the catches made by all purse seine and drift gill net vessels over 5 net tons (Customs measure) and also the catch of the larger of the boats of less than 5 net tons.

Data in the mackerel fishery are also included in the catch of States.

Mackerel fishery of the Atlantic coast, 1933

CATCH: BY AREAS IN 7-DAY PERIODS

Date	Southern (Area XXIII)		Block Island (Area XXII, west of Nantucket Shoals)		Gulf of Maine (Area XXII north of Nantucket Shoals)		Cape Shore (Area XXI)	Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	Seiners	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Apr. 9-15	40,200	8,300						48,500
Apr. 16-22	1,160,600	10,900						1,171,500
Apr. 23-29	390,500	3,900						394,400
Apr. 30-May 6	989,600	228,300						1,217,900
May 7-13	238,900	92,500						331,400
May 14-20	731,200	205,500	2,552,200					3,488,900
May 21-27		25,600	1,348,400		10,400	200		1,384,600
May 28-June 3		40,900	229,100	12,500		22,700		305,200
June 4-10			1,064,300	12,600	16,100	97,400	1,200	1,191,600
June 11-17			484,800		55,000	48,900		588,700
June 18-24			519,300	3,000	97,600	41,100		661,000
June 25-July 1			70,300		479,500	20,900		570,700
July 2-8			39,800		401,600	26,500		467,900
July 9-15					901,500	14,100		915,600
July 16-22					799,700	24,800		824,500
July 23-29					1,086,200	9,700		1,095,900
July 30-Aug. 5					1,476,500	11,600		1,488,100
Aug. 6-12					680,300	1,600		681,900
Aug. 13-19					1,377,400	3,300		1,380,700
Aug. 20-26					1,668,600	1,000		1,669,600
Aug. 27-Sept. 2					1,472,400			1,472,400
Sept. 3-9					1,082,800			1,082,800
Sept. 10-16					299,500			299,500
Sept. 17-23					519,900	2,000		521,900
Sept. 24-30					1,591,700			1,591,700
Oct. 1-7					329,900			329,900
Oct. 8-14					1,755,900	300		1,756,200
Oct. 15-21					1,139,700	600		1,140,300
Oct. 22-28					361,300	1,500		362,800
Oct. 29-Nov. 4					131,900	22,000		153,900
Nov. 5-11					8,100	32,300		40,400
Nov. 12-18						138,700		138,700
Nov. 19-25						159,400		159,400
Nov. 26-Dec. 2						420,600		420,600
Dec. 3-9						182,200		182,200
Dec. 10-16						1,000		1,000
Dec. 17-23						300		300
Total	3,551,000	615,900	6,308,200	28,100	17,743,500	1,284,700	1,200	29,532,600

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[5] This section was prepared by O. E. Sette of the Division of Scientific Inquiry of the Bureau.

Mackerel fishery of the Atlantic coast, 1933—Continued

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
SOUTHERN—AREA XXIII					
Seiners:	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Regular vessels	35	1,561	445	160	3,310,700
Miscellaneous vessels	9	289	110	13	240,300
Netters:					
Regular vessels	18	354	125	120	587,100
Miscellaneous vessels	1	8	5	3	17,000
Miscellaneous boats	2			4	11,800
Total	[1] 63	2,212	685	300	4,166,900
BLOCK ISLAND—AREA XXII					
(West of Nantucket Shoals only)					
Seiners:					
Regular vessels	57	2,303	715	256	6,174,400
Miscellaneous vessels	5	102	50	8	133,800
Netters: Regular vessels	3	32	17	6	28,100
Total	[1] 65	2,437	782	270	6,336,300
GULF OF MAINE—AREA XXII					
(North of Nantucket Shoals only)					
Seiners:					
Regular vessels	61	2,057	715	1,160	15,649,500
Miscellaneous vessels	26	482	216	165	1,318,500
Miscellaneous boats	21			114	775,500
Netters:					
Spring and summer:					
Miscellaneous vessels	13	179	78	44	86,200
Miscellaneous boats	48			239	237,600
Fall:					
Regular vessels	34	856	262	287	877,100
Miscellaneous vessels	20	372	134	38	53,700
Miscellaneous boats	13			32	30,100
Total	[1] 154	3,946	1,405	2,079	19,028,200
CAPE SHORE—AREA XXI					
Seiners	1	67	14	1	1,200
Total seiners	[1] 93			1,877	27,603,900
Total netters	[1] 72			773	1,928,700
Grand total	[1] 129			2,650	[2] 29,532,600

[1] Exclusive of duplication and of boats.

[2] Of this total approximately 21,430,000 pounds were tinkers (under 1½ pounds each) and 8,102,000 pounds were of larger sizes. There were no bullseye mackerel landed by the fleet.

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

FISHERIES OF THE MIDDLE ATLANTIC STATES

(Area XXIII)[6]

The yield of the commercial fisheries of the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) during 1933 amounted to 169,753,735 pounds, valued at $4,811,055 to the fishermen, representing an increase of 20 percent in volume and 3 percent in value as compared with the catch in the previous year. These fisheries gave employment to 8,574 fishermen, as compared with 8,370 in 1932.

There were 398 fishery wholesale and manufacturing establishments in the 4 States in 1933 as compared with 418 in 1931 when the most recent previous survey of such concerns was made. In 1933 these establishments employed 5,631 persons, paid $6,085,981 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $11,219,966. In 1931 the wholesale and manufacturing firms employed 4,989 persons, paid $7,042,586 in salaries and wages, and produced manufactured products valued at $12,451,810.

Fisheries of the Middle Atlantic States, 1933

SUMMARY OF CATCH

Product	New York		New Jersey		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	28, 305, 152	$988, 984	79, 038, 724	$1, 138, 015	52, 232	$2, 980
Shellfish, etc	11, 606, 280	1, 463, 581	14, 224, 713	1, 008, 309		
Total	39, 911, 432	2, 452, 565	93, 263, 437	2, 146, 324	52, 232	2, 980

Product	Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	35, 375, 380	$136, 191	142, 771, 488	$2, 266, 170
Shellfish, etc	1, 151, 254	72, 995	26, 982, 247	2, 544, 885
Total	36, 526, 634	209, 186	169, 753, 735	4, 811, 055

OPERATING UNITS: BY STATES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	825	1, 267		350	2, 442
On boats and shore:					
Regular	1, 509	954		34	2, 497
Casual	1, 482	1, 622	53	478	3, 635
Total	3, 816	3, 843	53	862	8, 574
Vessels:					
Steam	9			10	19
Net tonnage	1, 773			1, 237	3, 010
Motor	160	208		16	384
Net tonnage	2, 422	3, 470		229	6, 121

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[6] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included in this area craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery which extends into Area XXIV. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Middle Atlantic States, 1933—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Vessels—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Sail		3		1	4
Net tonnage		24		8	32
Total vessels	169	211		27	407
Total net tonnage	4,195	3,494		1,474	9,163
Boats:					
Motor	636	1,029	5	77	1,747
Other	1,188	740	14	181	2,123
Accessory boats	39	88		30	157
Apparatus:					
Purse seines:					
Menhaden		8		10	18
Length, yards		2,806		3,140	5,946
Other	2	7			9
Length, yards	800	2,510			3,310
Haul seines	71	105	12	61	249
Length, yards	5,926	9,040	1,635	18,990	35,591
Gill nets:					
Anchor	46	10			56
Square yards	40,832	5,830			46,662
Drift	254	605	7	63	929
Square yards	423,369	448,333	5,200	145,720	1,022,622
Runaround	43	69		33	145
Square yards	124,822	210,695		41,450	376,967
Stake	49	251		99	399
Square yards	23,161	46,882		7,770	77,813
Lines:					
Hand	225	463		12	700
Hooks	441	720		24	1,185
Trawl	693	712		2	1,407
Hooks	187,600	420,400		1,300	609,300
Troll	20	404			424
Hooks	20	404			424
Trot with baits or snoods		9			9
Baits or snoods		9,900			9,900
Trot with hooks	14				14
Hooks	1,495				1,495
Pound nets	301	153		32	486
Weirs		88			88
Stop nets	24	65		7	96
Square yards	11,258	50,615		1,820	63,693
Fyke nets	849	1,369		449	2,667
Dip nets	5	34		51	90
Cast nets		3			3
Scap nets	279				279
Drag nets	47	14			61
Yards at mouth	94	28			122
Otter trawls	130	67			197
Yards at mouth	2,791	1,514			4,305
Wire baskets		12			12
Pots:					
Crab		10			10
Eel	3,877	2,571		876	7,324
Lobster	18,340	28,071		165	46,576
Harpoons	18	1			19
Spears	77	92			169
Dredges:					
Clam	14	43		33	90
Yards at mouth	12	48		47	107
Crab	6	69		11	86
Yards at mouth	14	90		20	124
Mussel	2				2
Yards at mouth	2				2
Oyster	78	259		16	353
Yards at mouth	115	309		23	447
Scallop	250	10			260
Yards at mouth	365	34			399
Tongs	837	783		32	1,652
Rakes	568	509			1,077
Forks	271	51			322
Hoes		176			176
Gaffs		2			2

Fisheries of the Middle Atlantic States, 1933—Continued

CATCH: By States

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	218,257	$5,023	13,990	$244	8,775	$88	1,148,980	$4,786	1,390,002	$10,141
Bluefish	1,131,721	56,097	2,115,304	76,146			4,720	236	3,251,745	132,479
Bonito	159,007	9,541	88,407	4,103					247,414	13,644
Butterfish	1,498,212	61,339	2,912,214	119,319					4,410,426	180,658
Carp	219,497	17,574	143,471	16,047	640	64	26,420	1,589	390,028	35,274
Catfish and bullheads	19,008	2,561	55,380	3,321			1,845	116	76,233	5,998
Cero			2,500	75					2,500	75
Cod	4,260,669	112,583	3,229,886	99,688			2,240	69	7,492,795	212,340
Crevalle			7,254	141					7,254	141
Croaker	80,147	1,531	1,901,073	44,945			67,130	1,068	2,048,350	47,544
Cusk	3,500	99							3,500	99
Dolphin			111	9					111	9
Drum:										
Black	447	9							447	9
Red or redfish			8,770	126			520	16	9,290	142
Eels:										
Common	290,470	27,446	336,466	28,565			53,140	3,892	680,076	59,903
Conger	5,260	257	11,163	432					16,423	689
Flounders	5,191,128	192,032	4,051,797	170,601			9,450	492	9,252,375	363,125
Frigate mackerel	81,886	1,234	19,754	243					101,640	1,477
Goosefish			10,000	38					10,000	38
Grayfish			6,739	135					6,739	135
Haddock	8,506,679	248,282							8,506,679	248,282
Hake	139,954	2,811	22,171	360					162,125	3,171
Halibut	52,508	7,280							52,508	7,280
Herring:										
Round			750	8					750	8
Sea	74,987	610	590,465	5,171					665,452	5,781
Hickory shad	1,300	25							1,300	25
Kingfish or "king mackerel"			140	5					140	5
King whiting or "kingfish"	73,223	4,057	84,039	10,932					157,262	14,989
Mackerel	343,717	12,353	318,047	9,692					661,764	22,045
Menhaden	201,176	938	45,774,117	122,929			33,600,000	111,700	79,575,293	235,567
Mullet	2,500	96	82,747	6,234			233,000	2,390	318,247	8,720
Mummichog	25,050	2,505	25,925	1,939					50,975	4,444
Pigfish			203	5					203	5
Pike or pickerel	420	53							420	53
Pollock	770,231	11,551	6,280	94					776,511	11,645
Pompano			317	77					317	77
Scup or porgy	1,478,153	26,649	4,881,364	65,293					6,359,517	91,942
Sea bass	505,688	23,668	1,969,143	63,601					2,474,831	87,269

Sea robin	18,758	276	10,805	109					29,563	385
Shad	351,786	28,761	457,458	45,181	2,217	392	22,325	1,993	833,786	76,327
Sharks	2,500	35	9,610	203					12,110	238
Sheepshead			9	1					9	1
Silversides	18,500	1,838	4,830	676					23,330	2,514
Skates	725	7	82,976	712					83,701	719
Smelts	245	47							245	47
Spanish mackerel			6,419	287					6,419	287
Spot	22,765	463	473,565	6,958			31,920	903	528,250	8,324
Squeteagues or "sea trout":										
Gray	823,634	38,147	6,927,381	185,597			123,180	3,341	7,874,195	227,085
Spotted			30	2					30	2
Squirrel hake			52,765	402					52,765	402
Striped bass	18,954	2,724	9,122	1,770			11,700	1,382	39,776	5,876
Sturgeon	1,851	311	26,713	2,130			1,200	300	29,764	2,741
Suckers	28,624	2,365	102,575	8,462	40,600	2,436			171,799	13,263
Sunfish	1,690	132							1,690	132
Swellfish	2,000	200							2,000	200
Swordfish	100,966	12,441	1,600	128					102,566	12,569
Tautog	61,158	1,584	70,923	10,048					132,081	11,632
Thimble-eyed mackerel			24,475	374					25,475	374
Tilefish	1,350,000	67,500	25	1					1,350,025	67,501
Tomcod	7,690	338							7,690	338
Tuna or "horse mackerel"	6,736	270	36,492	1,656					43,228	1,926
Whitebait	3,000	450							3,000	450
White perch	15,182	1,119	29,420	2,666			30,650	1,490	75,252	5,275
Whiting	106,111	1,028	2,040,544	20,134			480	30	2,147,135	21,192
Wolffish	25,625	576							25,625	576
Yellow perch	1,857	168					6,480	398	8,337	566
Total	28,305,152	988,984	79,038,724	1,138,015	52,232	2,980	35,375,380	136,191	142,771,488	2,266,170
SHELLFISH, ETC.										
Crabs:										
Hard	149,383	5,437	709,410	18,356			96,600	1,295	955,393	25,088
King			2,183,772	5,931			556,600	595	2,750,372	6,526
Soft	825	225	57,363	12,239			36,000	7,200	94,188	19,664
Lobsters	346,496	67,256	364,220	67,629			12,840	2,568	723,556	137,453
Shrimp	59,912	11,981	25,741	3,328					85,653	15,309
Squid	444,938	6,696	347,312	8,760					792,250	15,456
Clams:										
Hard, public [1]	1,923,610	271,295	1,405,204	215,579			191,300	30,310	3,520,114	517,184
Hard, private [1]	21,040	4,601	70,461	8,721			9,640	1,898	101,141	15,220
Soft, public [2]	222,150	18,760	913,560	45,752					1,135,710	64,512
Surf or skimmer	379,500	18,380	146,313	5,732					525,813	24,112
Conchs	35,000	2,095	54	2					35,054	2,097
Mussels, sea	47,400	3,150	5,200	200					52,600	3,350

[1] Statistics on hard clams are based on yields of 8 pounds of meats to the bushel in New York, 8.96 in New Jersey, and 10 pounds in Delaware.

[2] Statistics on soft clams used in this table are based on yields of 16 pounds of meats to the bushel in New York and 20 pounds in New Jersey.

Fisheries of the Middle Atlantic States, 1933—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH, ETC.—continued										
Oysters:[3]										
Market, public, spring	19,250	$2,662	10,966	$1,138	----	----	39,600	$5,140	69,816	$8,940
Market, public, fall	81,984	9,512	26,606	1,792	----	----	----	----	108,590	11,304
Market, private, spring	2,761,525	381,138	3,718,539	282,883	----	----	24,520	2,985	6,504,584	667,006
Market, private, fall	3,229,025	439,378	3,855,564	301,288	----	----	165,240	20,065	7,249,829	760,731
Periwinkles and cockles	----	----	100	2	----	----	----	----	100	2
Scallops:										
Bay	48,000	17,100	594	30	----	----	----	----	48,594	17,130
Sea	1,823,492	193,445	373,589	22,402	----	----	----	----	2,197,081	215,847
Terrapin, diamond-back	----	----	502	145	----	----	410	260	912	405
Turtles, snapper	----	----	2,500	250	----	----	8,504	679	11,004	929
Bloodworms	9,250	8,390	1,740	1,505	----	----	----	----	10,990	9,895
Sandworms	3,500	2,080	5,403	4,645	----	----	----	----	8,903	6,725
Total	11,606,280	1,463,581	14,224,713	1,008,309	----	----	1,151,254	72,995	26,982,247	2,544,885
Grand total	39,911,432	2,452,565	93,263,437	2,146,324	52,232	$2,980	36,526,634	209,186	169,753,735	4,811,055

[3] Statistics on oysters used in this table are based on yields of 7 pounds of meats to the bushel in New York, 8.70 in New Jersey, and 7.88 in Delaware.

NOTE.—Of the total catch in New Jersey, 7,500 pounds of shad, valued at $600, were caught in the St. Johns River in Florida, and 1,447,252 pounds of fishery products, valued at $47,109, were taken in the southern trawl fishery off southern New Jersey, Maryland, Virginia, and North Carolina. Of the total catch in New York, 1,024,291 pounds of fishery products, valued at $35,928, were taken in the southern trawl fishery. The products of the southern trawl fishery consisted principally of croaker, flounders, scup, and sea bass.

Fisheries of the Middle Atlantic States, 1933—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	New York		New Jersey		Delaware		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:								
Hard..........number..	418, 149	$5, 437	2, 128, 230	$18, 356	289, 800	$1, 295	2, 866, 179	$25, 088
King..............do....	....	....	545, 943	5, 931	141, 650	595	687, 593	6, 526
Soft...............do....	3, 300	225	172, 089	12, 239	144, 000	7, 200	319, 389	19, 664
Clams:								
Hard, public...bushels..	240, 451	271, 295	156, 831	215, 579	19, 130	30, 310	416, 412	517, 184
Hard, private......do....	2, 630	4, 601	7, 864	8, 721	964	1, 898	11, 458	15, 220
Soft, public........do....	13, 884	18, 760	45, 678	45, 752	....	....	59, 562	64, 512
Surf or skimmer...do....	31, 625	18, 380	11, 705	5, 732	....	....	43, 330	24, 112
Conchs...............do....	1, 944	2, 095	3	2	....	....	1, 947	2, 097
Mussels, sea..........do....	4, 740	3, 150	400	200	....	....	5, 140	3, 350
Oysters:								
Market, public, spring bushels..	2, 750	2, 662	1, 260	1, 138	5, 025	5, 140	9, 035	8, 940
Market, public, fall bushels..	11, 712	9, 512	3, 058	1, 792	....	....	14, 770	11, 304
Market, private, spring bushels..	394, 504	381, 138	427, 418	282, 883	3, 112	2, 985	825, 034	667, 006
Market, private, fall bushels..	461, 289	439, 378	443, 168	301, 288	20, 969	20, 065	925, 426	760, 731
Periwinkles and cockles bushels..	....	....	8	2	....	....	8	2
Scallops:								
Bay..............do....	9, 600	17, 100	99	30	....	....	9, 699	17, 130
Sea..............do....	303, 915	193, 445	62, 265	22, 402	....	....	366, 180	215. 847

SEED OYSTER FISHERY

Item	New York		New Jersey		Delaware		Total	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels....................	24		1, 514		48		1, 586	
On boats and shore:								
Regular..................	230		68		....		298	
Casual..................	....		107		43		150	
Total..................	254		1, 689		91		2, 034	
Vessels:								
Motor..................	7		....		....		7	
Net tonnage..............	69		....		....		69	
Sail..................	....		139		7		146	
Net tonnage..............	....		2, 881		96		2, 977	
Total vessels..............	7		139		7		153	
Total net tonnage........	69		2, 881		96		3, 046	
Boats:								
Motor..................	120		86		....		206	
Other..................	30		81		41		152	
Apparatus:								
Dredges..................	6		278		16		300	
Yards at mouth..........	9		333		21		363	
Tongs..................	194		140		40		374	
Rakes..................	45		34		....		79	
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring..........	42, 600	$20, 550	926, 000	$232, 582	34, 940	$8, 730	1, 003, 540	$261, 862
Seed, public, fall..........	12, 500	5, 500	11, 000	2, 750	....	....	23, 500	8, 250
Seed, private, spring..........	40, 290	39, 540	....	....	....	....	40, 290	39, 540
Seed, private, fall..........	38, 290	38, 290	....	....	....	....	38, 290	38, 290
Total..................	133, 680	103, 880	937, 000	235, 332	34, 940	8, 730	1, 105, 620	347, 942

NOTE.—Of the total number of persons fishing for seed oysters, 1,881 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 87 vessels, 79 motor boats, 92 other boats, 172 dredges, 327 tongs, and 15 rakes.

Industries related to the fisheries of the Middle Atlantic States, 1933

OPERATING UNITS, SALARIES, AND WAGES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	100	10			110
On boats		92			92
Total	100	102			202
Vessels:					
Motor	26	4			30
Net tonnage	580	49			629
Boats		87			87
Wholesale and manufacturing:					
Establishments	210	124	49	15	398
Persons engaged:					
Proprietors	184	116	44	14	358
Salaried employees	775	159	113	20	1,067
Wage earners:					
Average for season	1,896	1,381	477	452	4,206
Average for year	1,457	906	396	189	2,948
Paid to salaried employees	$2,164,542	$311,040	$200,846	$12,460	$2,688,888
Paid to wage earners	$2,088,832	$785,657	$403,433	$119,171	$3,397,093
Total salaries and wages	$4,253,374	$1,096,697	$604,279	$131,631	$6,085,981
Fishermen manufacturing	348	157		7	512

PRODUCTS MANUFACTURED

Item	New York		New Jersey		Pennsylvania		Delaware	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Buffalofish, smoked pounds	440,000	$131,750						
Butterfish, smoked do	408,600	100,050	80,896	$20,269	(1)	(1)		
Carp, smoked do	91,000	27,200	(1)	(1)				
Chubs, cisco, lake herring, and tullibee, smoked pounds	2,495,880	534,914	(1)	(1)	333,000	$93,000		
Cod:								
Fresh fillets do	2,365,354	306,896						
Smoked fillets do	66,305	13,700	(1)	(1)				
Flounders, fresh fillets pounds	669,780	108,678						
Haddock, fresh fillets pounds	1,500,661	207,200						
Hake, fresh fillets do	297,000	31,440						
Herring, sea:								
Kippered do	55,100	10,210	(1)	(1)	(2)	(2)		
Bloaters do	(1)	(1)	(1)	(1)	540,000	30,250		
Lake trout, smoked do	90,400	28,650	(1)	(1)	(1)	(1)		
Mackerel, smoked do	77,300	13,602	(1)	(1)	(1)	(1)		
Paddlefish or spoonbill cat, smoked pounds	338,600	155,920						
Salmon:								
Kippered do	269,000	82,700	(3)	(3)	(1)	(1)		
Smoked do	5,427,102	1,494,928	478,966	130,864	(1)	(1)		
Shad, smoked do	149,000	30,400	(1)	(1)	(1)	(1)		
Sturgeon, smoked do	1,084,000	548,660	205,987	149,781	(1)	(1)		
Sturgeon, caviar, canned standard cases	2,596	333,530						
Whitefish, smoked pounds	1,104,000	297,750	(1)	(1)	340,000	85,200		
Whitefish roe and caviar, canned standard cases	122	4,569						
Crabs, king, scrap and meal tons			278	8,150				
Clams:								
Hard, fresh-shucked gallons			1,875	2,723	4,110	14,495		
Soft, fresh-shucked gallons			16,360	14,902				

[1] The production of this item is included under "Unclassified products."
[2] Kippered sea herring is included with bloaters.
[3] Kippered salmon is included with smoked salmon.

Industries related to the fisheries of the Middle Atlantic States, 1933—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.								
Marine-shell products:								
Buttons........gross....	825,703	$509,920	1,617,128	$1,073,275	1,143,660	$589,743	--------	--------
Novelties..............	--------	46,813	--------	[4] 81,255	--------	45,739	--------	--------
Oysters, fresh-shucked gallons..	265,967	469,016	372,848	577,217	60,958	139,056	39,671	$48,434
Oyster-shell products:								
Poultry feed......tons..	--------	--------	4,553	44,864	3,646	33,119	(1)	(1)
Lime..............do....	--------	--------	1,610	6,629	1,114	4,570	(1)	(1)
Unclassified products:								
Fillets, fresh and frozen pounds..	[5] 145,492	[5] 33,972	--------	--------	--------	--------	--------	--------
Smoked..........do....	(6)	(6)	[7] 581,849	[7] 162,800	[8] 1,014,000	[8] 291,270	--------	--------
Canned standard cases..	[9] 6,234	[9] 75,343	(6)	(6)	--------	--------	--------	--------
Miscellaneous..........	--------	[10] 373,591	--------	[11] 781,226	--------	--------	--------	[12] 200,331
Total..................	--------	5,971,402	--------	3,053,955	--------	1,329,442	--------	218,765
By fishermen:								
Bluefish, smoked pounds..	--------	--------	50	2	--------	--------	--------	--------
Eels:								
Smoked..........do....	2,150	537	5,450	1,675	--------	--------	--------	--------
Pickled.........do....	--------	--------	48	14	--------	--------	--------	--------
Herring, sea, smoked pounds..	--------	--------	4,900	196	--------	--------	--------	--------
Mackerel, smoked..do....	--------	--------	100	20	--------	--------	--------	--------
Squirrel hake, smoked pounds..	--------	--------	50	5	--------	--------	--------	--------
Whiting, smoked...do....	--------	--------	50	5	--------	--------	--------	--------
Clams, soft, fresh-shucked gallons..	--------	--------	6,840	5,244	--------	--------	--------	--------
Scallops:								
Bay, fresh-shucked gallons..	5,400	17,100	--------	--------	--------	--------	--------	--------
Sea, fresh-shucked gallons..	204,555	192,647	35,603	33,813	--------	--------	--------	--------
Sturgeon roe, salted pounds..	--------	--------	50	33	--------	--------	--------	--------
King crab scrap....tons..	--------	--------	214	6,655	--------	--------	80	2,200
Total..................	--------	210,284	--------	47,662	--------	--------	--------	2,200
Grand total............	--------	6,181,686	--------	3,101,617	--------	1,329,442	--------	250,965

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[1] The production of this item is included under "Unclassified products."

[4] Includes the value of a small quantity of fresh-water mussel shell novelties.

[5] Includes fresh fillets of bluefish, halibut, mackerel, pollock, red snapper, and frozen fillets of salmon.

[6] This has been included under "Miscellaneous."

[7] Includes smoked bluefish, carp, chubs, cisco, cod, eels, flounders, goosefish, haddock, lake trout, mackerel, sea herring (bloaters), shad, tullibee, and whitefish and kippered sea herring.

[8] Includes smoked alewives, butterfish, haddock fillets, haddock (finnan haddie), lake trout, mackerel, salmon, shad, and sturgeon, and kippered salmon and shad.

[9] Includes canned clam products, pickled eels, terrapin and turtle products, sea mussels, and salmon caviar.

[10] Includes smoked eels, haddock fillets, and sea herring (bloaters); fish meal; and fresh-water mussel shell products.

[11] Includes canned hard clams, canned hard clam chowder, canned oysters, shredded salt cod, and fresh-cooked crab meat.

[12] Includes menhaden dry and acid scrap and oil, and oyster-shell products.

NOTE.—The total value of products for the Middle Atlantic States was as follows: By manufacturing establishments, $10,603,564; and by fishermen, $260,146. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting craft, 135 have been included as fishermen and among the total number of persons engaged in the preparation of fishermen's prepared products, 511 have been included as fishermen.

NEW YORK

Fisheries of New York, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines, other than menhaden	Haul seines	Gill nets				Lines			
			Anchor	Drift	Runaround	Stake	Hand	Trawl	Troll	Trot with hooks
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	17	-------	6	9	18	-------	36	77	-------	-------
On boats and shore:										
Regular	-------	57	27	51	46	9	104	90	5	-------
Casual	-------	98	6	174	1	62	32	18	5	14
Total	17	155	39	234	65	71	172	185	10	14
Vessels:										
Motor	2	-------	3	1	6	-------	6	8	-------	-------
Net tonnage	41	-------	22	21	61	-------	135	219	-------	-------
Boats:										
Motor	-------	-------	12	-------	23	-------	44	53	5	-------
Other	-------	68	13	114	2	45	16	6	-------	14
Accessory boats	2	-------	-------	-------	-------	-------	-------	37	-------	-------
Apparatus:										
Number	2	71	46	254	43	49	225	693	20	14
Length, yards	800	5,926	-------	-------	-------	-------	-------	-------	-------	-------
Square yards	-------	-------	40,832	423,369	124,822	23,161	-------	-------	-------	-------
Hooks, baits, or snoods	-------	-------	-------	-------	-------	-------	441	187,600	20	1,495

Item	Pound nets	Stop nets	Fyke nets	Dip nets	Scap nets	Drag nets	Otter trawls	Pots		Harpoons
								Eel	Lobster	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	3	-------	-------	-------	-------	-------	357	2	7	40
On boats and shore:										
Regular	174	2	40	5	-------	27	75	66	175	20
Casual	17	29	59	-------	279	20	12	37	31	-------
Total	194	31	99	5	279	47	444	105	213	60
Vessels:										
Steam	-------	-------	-------	-------	-------	-------	9	-------	-------	-------
Net tonnage	-------	-------	-------	-------	-------	-------	1,773	-------	-------	-------
Motor	1	-------	-------	-------	-------	-------	56	1	5	8
Net tonnage	10	-------	-------	-------	-------	-------	786	10	33	117
Total vessels	1	-------	-------	-------	-------	-------	65	1	5	8
Total net tonnage	10	-------	-------	-------	-------	-------	2,559	10	33	117
Boats:										
Motor	43	-------	17	-------	-------	12	55	35	120	10
Other	115	22	75	5	215	-------	-------	54	2	-------
Apparatus:										
Number	301	24	849	5	279	47	130	3,877	18,340	18
Square yards	-------	11,258	-------	-------	-------	-------	-------	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	94	2,791	-------	-------	-------

Fisheries of New York, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Spears	Dredges					Tongs	Rakes	Forks	Total, exclusive of duplication
		Clam	Crab	Mussel	Oyster	Scallop				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		10	5	3	165	134	50			825
On boats and shore:										
Regular	43	12				41	584	302	133	1,509
Casual	34	2				161	209	280	138	1,482
Total	77	24	5	3	165	336	843	582	271	3,816
Vessels:										
Steam										9
Net tonnage										1,773
Motor		5	1	1	39	25	23			160
Net tonnage		43	23	13	791	382	148			2,422
Total vessels		5	1	1	39	25	23			169
Total net tonnage		43	23	13	791	382	148			4,195
Boats:										
Motor		9				8	272	154		636
Other	71					125	256	364	16	1,188
Accessory boats										39
Apparatus:										
Number	77	14	6	2	78	250	837	568	271	
Yards at mouth		12	14	2	115	365				

CATCH: BY GEAR

Species	Purse seines, other than menhaden		Haul seines		Gill nets							
					Anchor		Drift		Runaround		Stake	
	Lb.	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*	*Lb.*	*Value*
Alewives			37,119	$540			12,850	$302			767	$31
Bluefish	27,700	$1,422	1,100	85	55,500	$2,720	26,000	1,300	102,200	$2,658	2,500	250
Carp			64,283	4,701	1,089	104	1,001	103			625	44
Catfish and bullheads			2,695	401			1,280	159				
Eels, common			5,500	725			287	49				
King whiting or "kingfish"			12,500	1,000								
Mackerel							36,400	1,092	127,000	5,820		
Mummichog			18,000	1,800								
Scup or porgy			600	12								
Shad			4,040	448			297,753	23,844			34,143	3,669
Silversides			18,500	1,838								
Squeteagues or "sea trout", gray	5,000	250	32,000	1,600	52,900	2,390			31,700	1,415		
Striped bass			4,214	495			2,283	298			6,591	1,004
Sturgeon							800	200			60	9
Suckers			5,350	451			187	28				
Sunfish			200	20			35	5				
White perch			2,850	240			989	83			4,124	297
Yellow perch			350	27							500	28
Shrimp			17,500	3,500								
Total	32,700	1,672	226,801	17,883	109,489	5,214	379,865	27,463	260,900	9,893	49,310	5,332

Fisheries of New York, 1933—Continued

CATCH: By gear—Continued

Species	Lines								Pound nets	
	Hand		Trawl		Troll		Trot with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives									1,000	$10
Bluefish	734,850	$37,969			15,000	$1,200			166,579	8,474
Bonito									159,007	9,541
Butterfish									1,479,660	60,660
Carp							508	$61		
Catfish and bullheads							400	63		
Cod	64,802	1,840	396,500	$12,335					42,433	854
Croaker									3,842	174
Eels:										
Common							2,371	308	85,065	9,728
Conger			2,000	200						
Flounders	29,250	877							194,157	10,409
Frigate mackerel									81,886	1,234
Haddock	1,000	20	12,000	340						
Herring, sea									74,987	610
Hickory shad									1,300	25
King whiting or "kingfish"									58,112	2,967
Mackerel									180,167	5,435
Menhaden									201,176	938
Mullet									2,500	96
Pollock	125,000	2,500							9,341	139
Scup or porgy	24,600	492							1,020,187	16,482
Sea bass	102,000	5,880							56,891	3,512
Sea robin									18,758	276
Shad									15,758	788
Sharks									2,500	35
Spot									21,029	423
Squeteagues or "sea trout", gray	10,000	470	23,500	1,045					654,793	30,377
Striped bass									4,579	726
Sturgeon									160	26
Swellfish									2,000	200
Swordfish									180	20
Tautog	25,000	750							34,598	803
Tilefish			1,350,000	67,500						
Tuna or "horse mackerel"									6,736	270
Whitebait									3,000	450
White perch									450	65
Whiting									105,211	1,019
Crabs, hard									21,050	362
Lobsters									800	200
Squid									442,492	6,619
Total	1,116,502	50,798	1,784,000	81,420	15,000	1,200	3,279	432	5,152,384	173,947

Species	Stop nets		Fyke nets		Dip nets		Scap nets		Drag nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	300	$3	81,655	$1,000			84,566	$3,137		
Carp	92,258	7,717	7,654	675			52,079	4,169		
Catfish and bullheads	545	95	12,246	1,569			1,802	270		
Eels, common	820	70	1,896	231			76	6		
Flounders			317,000	4,310						
Pike or pickerel	30	3	390	50						
Shad	40	6					52	6		
Smelt							245	47		
Striped bass	855	122	378	70			43	8		
Sturgeon	400	32	16	1			50	10		
Suckers	926	84	12,889	1,034			9,272	768		
Sunfish	75	4	1,065	73			315	30		
Tautog			1,500	30						
Tomcod			7,560	333			130	5		
White perch	50	5	5,830	328			889	101		
Yellow perch			862	96			145	17		
Crabs:										
Hard			20,000	200						
Soft					825	$225				
Shrimp									42,400	$8,480
Total	96,299	8,141	470,941	10,000	825	225	149,664	8,574	42,400	8,480

Fisheries of New York, 1933—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Pots				Harpoons		Spears	
			Eel		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	292	$19								
Butterfish	18, 552	679								
Catfish and bullheads			40	$1						
Cod	3, 756, 934	97, 554								
Croaker	76, 305	1, 357								
Cusk	3, 500	99								
Drum, black	447	9								
Eels:										
Common			173, 205	14, 214					21, 250	$2, 115
Conger	3, 260	57								
Flounders	4, 650, 721	176, 436								
Haddock	8, 493, 679	247, 922								
Hake	139, 954	2, 811								
Halibut	52, 508	7, 280								
King whiting or "kingfish"	2, 611	90								
Mackerel	150	6								
Mummichog			7, 050	705						
Pollock	635, 890	8, 912								
Scup or porgy	432, 766	9, 663								
Sea bass	265, 897	10, 231			80, 900	$4, 045				
Skates	725	7								
Spot	1, 736	40								
Squeteagues or "sea trout," gray	13, 741	600								
Striped bass	11	1								
Sturgeon	365	33								
Swordfish							100, 786	$12, 421		
Tautog	60	1								
Whiting	900	9								
Wolffish	25, 625	576								
Lobsters	4, 621	607			341, 075	66, 449				
Shrimp	12	1								
Conchs					18, 000	500				
Scallops, sea	297	47								
Squid	2, 446	77								
Total	18, 584, 005	565, 124	180, 295	14, 923	439, 975	70, 994	100, 786	12, 421	21, 250	2, 115

Species	Dredges									
	Clam		Crab		Mussel		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard			108, 333	$4, 875						
Clams, surf or skimmers	359, 000	$16, 180								
Conchs									17, 000	$1, 595
Mussels, sea					45, 000	$3, 000	2, 400	$150		
Oysters:										
Market, private, spring							2, 717, 550	375, 901		
Market, private, fall							3, 179, 550	433, 591		
Scallops:										
Bay									48, 000	17, 100
Sea									1, 823, 195	193, 398
Total	359, 000	16, 180	108, 333	4, 875	45, 000	3, 000	5, 899, 500	809, 642	1, 888, 195	212, 093

Species	Tongs		Rakes		Forks	
Clams:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hard, public	1, 345, 710	$191, 976	577, 900	$79, 319		
Hard, private	21, 040	4, 601				
Soft, public	6, 400	725	64, 550	4, 885	151, 200	$13, 150
Surf or skimmers	20, 500	2, 200				
Oysters:						
Market, public, spring	19, 250	2, 662				
Market, public, fall	71, 484	8, 462	10, 500	1, 050		
Market, private, spring	43, 975	5, 237				
Market, private, fall	49, 475	5, 787				
Bloodworms					9, 250	8, 390
Sandworms					3, 500	2, 080
Total	1, 577, 834	221, 650	652, 950	85, 254	163, 950	23, 620

Fisheries of New York, 1933—Continued

OPERATING UNITS: BY COUNTIES

Item	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						188	44	300
On boats and shore:								
Regular		3	2	14	2	185	259	
Casual	8		72	154	56	130	97	
Total	8	3	74	168	58	503	400	300
Vessels:								
Steam								9
Net tonnage								1, 773
Motor						39	10	16
Net tonnage						594	152	424
Total vessels						39	10	25
Total net tonnage						594	152	2, 197
Boats:								
Motor						80	48	
Other	8	3	54	97	32	10	202	
Accessory boats						15	2	22
Apparatus:								
Purse seines:								
Other than menhaden						1	1	
Length, yards						400	400	
Haul seines			6	4	5	5	15	
Length, yards			650	560	585	60	860	
Gill nets:								
Drift			3	31	1			140
Square yards			8, 666	122, 461	800			25, 200
Runaround						2	31	
Square yards						16, 000	93, 200	
Lines:								
Hand						118		4
Hooks						231		8
Trawl						70	93	436
Hooks						70, 800	39, 200	30, 600
Troll						20		
Hooks						20		
Trot with hooks				1				
Hooks				150				
Pound nets							1	
Stop nets			2	1	12			
Square yards			140	100	7, 775			
Fyke nets	2		20	16	5			
Dip nets							5	
Scap nets	8		44	93	31			
Drag nets							5	
Yards at mouth							10	
Otter trawls						30	4	22
Yards at mouth						693	68	393
Pots:								
Eel				4		250	296	
Lobster						6, 820	2, 035	
Harpoons								2
Spears						12	39	
Dredges:								
Clam						12	1	
Yards at mouth						10	1	
Mussel							2	
Yards at mouth							2	
Oyster							10	12
Yards at mouth							13	18
Scallop						46	6	8
Yards at mouth						122	17	24
Tongs							162	
Rakes		3					84	
Forks						100	95	

Fisheries of New York, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Orange	Putnam	Queens	Rensselaer	Richmond	Rockland	Suffolk	Ulster	Westchester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			2		7		284		
On boats and shore:									
Regular	7				8	5	991	24	9
Casual	46	4		16	2	46	622	165	64
Total	53	4	2	16	17	51	1,897	189	73
Vessels:									
Motor			1		2		92		
Net tonnage			14		30		1,208		
Boats:									
Motor					8		499		1
Other	32	4		12		31	536	128	39
Apparatus:									
Haul seines	4	1		3			20	5	3
Length, yards	533	125		375			1,195	700	283
Gill nets:									
Anchor							44	2	
Square yards							40,497	335	
Drift	9			1		13		44	12
Square yards	37,928			3,200		42,766		142,731	39,617
Run-around							10		
Square yards							15,622		
Stake		1				10	23	1	14
Square yards		165				3,205	6,286	135	13,370
Lines:									
Hand							103		
Hooks							202		
Trawl							94		
Hooks							47,000		
Trot with hooks	1			1		3		6	2
Hooks	120			100		325		600	200
Pound nets							300		
Stop nets	1							7	1
Square yards	400							2,708	135
Fyke nets	6	1		3			765	23	8
Scap nets	15	2		6				78	2
Drag nets							42		
Yards at mouth							84		
Otter trawls			1		1		72		
Yards at mouth			30		17		1,590		
Pots:									
Eel						57	3,212	22	36
Lobster					1,150		8,255		80
Harpoons							16		
Spears							26		
Dredges:									
Clam					1				
Yards at mouth					1				
Crab					6				
Yards at mouth					14				
Oyster							56		
Yards at mouth							84		
Scallop					2		188		
Yards at mouth					5		197		
Tongs							674		1
Rakes							480		1
Forks							76		

CATCH: BY COUNTIES

Species	Albany		Bronx		Columbia		Dutchess		Greene	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,250	$43			47,733	$773	36,363	$1,461	12,317	$400
Carp	3,850	274			11,930	821	11,510	1,018	91,215	7,454
Catfish and bullheads	90	10			4,398	574	3,092	307	1,892	295
Eels, common					480	45	870	111	726	59
Pike or pickerel									38	5
Shad					6,086	540	101,857	7,280	1,500	133
Striped bass	16	2					40	8	700	85
Sturgeon							850	210	16	1
Suckers	2,850	210			4,351	338	3,103	241	2,273	186
Sunfish					60	6	600	33	200	20
Tomcod							130	5		
White perch					2,036	68	965	75	2,406	211
Yellow perch					50	10	117	12		
Clams, hard, public			3,600	$675						
Total	8,056	539	3,600	675	77,124	3,275	159,497	10,761	113,283	8,849

Fisheries of New York, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Kings		Nassau		New York		Orange	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							6, 105	$175
Bluefish	726, 850	$38, 176	96, 774	$2, 317	63, 215	$3, 161		
Bonito			79	5				
Butterfish	3, 217	160	1, 535	61				
Carp							8, 516	781
Catfish and bullheads							1, 768	339
Cod	332, 900	6, 837	118, 161	4, 843	3, 648, 444	95, 436		
Croaker	36	1			7, 070	174		
Cusk	200	4			3, 300	95		
Eels:								
Common	15, 000	1, 500	21, 000	2, 375			1, 132	136
Conger	178	4			2, 510	210		
Flounders	1, 032, 766	39, 740	100, 059	3, 005	455, 422	16, 057		
Frigate mackerel			11	1				
Haddock	288, 300	6, 275			8, 179, 879	240, 827		
Hake	2, 753	35			126, 608	2, 628		
Halibut	200	8			52, 102	7, 243		
King whiting or "kingfish"	25	1	26	1	22	1		
Mackerel	67, 000	4, 020	60, 212	1, 806	36, 400	1, 092		
Mummichog	12, 450	1, 245	6, 600	660				
Pollock	700	22			635, 140	8, 889		
Scup or porgy	12, 570	225	4, 828	88	65, 531	1, 375		
Sea bass	54, 236	2, 264	85, 950	4, 298	62, 984	1, 802		
Shad							17, 262	1, 621
Silversides	300	18	10, 200	1, 020				
Skates	725	7						
Spot			20	1	920	17		
Squeteagues or "sea trout", gray	6, 000	270	26, 032	1, 093	294	20		
Striped bass			3, 000	300			858	139
Sturgeon	8	1						
Suckers							4, 175	438
Sunfish							260	26
Swordfish					35, 796	4, 856		
Tautog	25, 000	750						
Tilefish	322, 000	16, 100			1, 028, 000	51, 400		
Tuna or "horse mackerel"			19	1				
Whiting	900	9	70	1				
Wolffish					25, 625	576		
Yellow perch							720	74
Crabs, soft			825	225				
Lobsters	174, 150	31, 347	19, 400	4, 850				
Shrimp			16, 400	3, 280				
Clams:								
Hard, public			257, 750	50, 185				
Soft, public			116, 000	11, 250				
Surf or skimmers	335, 000	14, 680	23, 500	1, 950				
Conchs	15, 200	1, 520						
Mussels, sea			47, 400	3, 150				
Oysters:								
Market, private, spring			200, 600	27, 800	524, 495	74, 925		
Market, private, fall			296, 400	42, 150	524, 495	74, 925		
Scallops, sea	968, 420	107, 600	171, 990	21, 341	426, 105	47, 345		
Squid			860	5	95	2		
Bloodworms	9, 000	8, 140	250	250				
Total	4, 406, 084	280, 959	1, 685, 951	188, 312	15, 904, 452	633, 056	40, 796	3, 729

Species	Putnam		Queens		Rensselaer		Richmond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2, 269	$85		
Carp	3, 855	$286			9, 226	870		
Catfish and bullheads	240	12			2, 794	422		
Croaker			140	$2				
Eels, common					350	87		
Flounders			5, 162	300			21, 000	$1, 050
King whiting or "kingfish"			20	1				
Pike or pickerel					17	3		
Shad					1, 215	110		
Suckers	385	26			200	14		
Tomcod	360	58						
White perch	80	8						
Yellow perch					80	5		
Crabs, hard							108, 333	4, 875
Lobsters							14, 500	2, 610
Clams, surf or skimmers							12, 000	500
Conchs							1, 800	75
Total	4, 920	390	5, 322	303	16, 151	1, 596	157, 633	9, 110

Fisheries of New York, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Rockland		Suffolk		Ulster		Westchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,681	$39	81,000	$970	28,753	$1,051	786	$26
Bluefish			244,882	12,443				
Bonito			158,928	9,536				
Butterfish			1,493,460	61,118				
Carp	250	25			74,885	4,636	4,260	409
Catfish and bullheads	140	14			3,504	472	1,090	116
Cod			161,164	5,467				
Croaker			72,901	1,354				
Drum, black			447	9				
Eels:								
Common	6,260	450	240,035	22,302	2,417	179	2,200	202
Conger			2,572	43				
Flounders			3,576,719	131,880				
Frigate mackerel			81,875	1,233				
Haddock			38,500	1,180				
Hake			10,593	148				
Halibut			206	29				
Herring, sea			74,987	610				
Hickory shad			1,300	25				
King whiting or "kingfish"			73,130	4,053				
Mackerel			180,105	5,435				
Menhaden			201,176	938				
Mullet			2,500	96				
Mummichog			6,000	600				
Pike or pickerel					215	24	150	21
Pollock			134,391	2,640				
Porgy			1,395,224	24,961				
Sea bass			302,518	15,304				
Sea robin			18,758	276				
Shad	17,562	1,812	17,488	1,397	135,578	11,177	53,238	4,691
Sharks			2,500	35				
Silversides			8,000	800				
Smelt					245	47		
Spot			21,825	445				
Squeteagues or "sea trout", gray			791,308	36,764				
Striped bass	7,878	1,135	4,590	727	27	6	1,845	322
Sturgeon			517	58			460	41
Suckers					7,697	562	3,590	350
Sunfish					570	47		
Swellfish			2,000	200				
Swordfish			65,170	7,585				
Tautog			36,158	834				
Tomcod			5,000	200	200	25	2,000	50
Tuna or "horse mackerel"			6,717	269				
White bait			3,000	450				
White perch	2,444	176	450	65	2,651	235	4,150	181
Whiting			105,141	1,018				
Yellow perch	500	28			390	39		
Crabs, hard			41,050	562				
Lobsters			136,946	28,149			1,500	300
Shrimp			43,512	8,701				
Clams:								
Hard, public			1,659,460	219,785			2,800	650
Hard, private			21,040	4,601				
Soft, public			106,150	7,510				
Surf or skimmer			9,000	1,250				
Conchs			18,000	500				
Oysters:								
Market, public, spring			19,250	2,662				
Market, public, fall			81,984	9,512				
Market, private, spring			2,036,430	278,413				
Market, private, fall			2,408,130	322,303				
Scallops:								
Bay			48,000	17,100				
Sea			256,977	17,159				
Squid			443,983	6,689				
Sandworms			3,500	2,080				
Total	36,715	3,679	16,956,647	1,280,473	257,132	19,500	78,069	7,359

Fisheries of New York, 1933—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Rakes		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	15		9				24	
On boats and shore:								
Regular			185		45		230	
Total	15		194		45		254	
Vessels, motor	3		4				7	
Net tonnage	45		24				69	
Boats:								
Motor			100		20		120	
Other			5		25		30	
Apparatus:								
Number	6		194		45			
Yards at mouth	9							
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring			35, 100	$17, 550	7, 500	$3, 000	42, 600	$20, 550
Seed, public, fall			5, 000	2, 500	7, 500	3, 000	12, 500	5, 500
Seed, private, spring	40, 290	$39, 540					40, 290	39, 540
Seed, private, fall	38, 290	38, 290					38, 290	38, 290
Total	78, 580	77, 830	40, 100	20, 050	15, 000	6, 000	133, 680	103, 880

NOTE.—The seed-oyster fishery of New York is confined to Suffolk County. Of the total number of persons fishing for seed oysters, 242 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated; 1 motor vessel, 188 tongs, and 15 rakes.

NEW JERSEY

Fisheries of New Jersey, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Runaround	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	150	73			8			80	38
On boats and shore:									
Regular			65	2	68	57	37	156	228
Casual			188	5	202	53	62	134	56
Total	150	73	253	7	278	110	99	370	322
Vessels:									
Motor	8	7			1			14	10
Net tonnage	285	132			11			175	107
Sail					1			1	1
Net tonnage					7			7	7
Total vessels	8	7			2			15	11
Total net tonnage	285	132			18			182	114
Boats:									
Motor			6	3	93	51	27	150	129
Other			95		54		22	1	
Accessory boats	22	12						30	10
Apparatus:									
Number	8	7	105	10	605	69	251	463	712
Length, yards	2, 806	2, 510	9, 040						
Square yards				5, 830	448, 333	210, 695	46, 882		
Hooks, baits or snoods								720	420, 490

Fisheries of New Jersey, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines		Pound nets	Weirs	Stop nets	Fyke nets	Dip nets	Cast nets	Drag nets
	Troll	Trot with baits or snoods							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	9		200						
On boats and shore:									
Regular	50	6	117		20	35	9		2
Casual	60	8	13	15	72	62	25	3	11
Total	119	14	330	15	92	97	34	3	13
Vessels:									
Motor	2		30						
Net tonnage	20		183						
Boats:									
Motor	101	7	20	4	19	31	9		8
Other			11	4	34	37	21		
Accessory boats	4		10						
Apparatus:									
Number	404	9	153	88	65	1,369	34	3	14
Square yards					50,615				
Yards at mouth									28
Hooks, baits or snoods	404	9,900							

Item	Otter trawls	Wire baskets	Pots			Harpoons	Spears	Dredges	
			Crab	Eel	Lobster			Clam	Crab
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	123					5		51	65
On boats and shore:									
Regular	61		2	35	177		48	8	2
Casual		1		51	55		44		
Total	184	1	2	86	232	5	92	59	67
Vessels:									
Motor	37					1		15	15
Net tonnage	705					26		229	312
Sail								2	2
Net tonnage								17	17
Total vessels	37					1		17	17
Total net tonnage	705					26		246	329
Boats:									
Motor	30		1	39	126		5	4	1
Other				27			69		
Accessory boats						1			
Apparatus:									
Number	67	12	10	2,571	28,071	1	92	43	69
Yards at mouth	1,514							48	90

Item	Dredges		Tongs	Rakes	Forks	Hoes	Gaffs	By hand	Total, exclusive of duplication
	Oyster	Scallop							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	635	27							1,267
On boats and shore:									
Regular	19		275	178	47	56	2	19	954
Casual	15		508	331	4	121		121	1,622
Total	669	27	783	509	51	177	2	140	3,843
Vessels:									
Motor	109	5							208
Net tonnage	2,025	83							3,470
Sail									3
Net tonnage									24
Total vessels	109	5							211
Total net tonnage	2,025	83							3,494
Boats:									
Motor	22		399	264		28			1,029
Other			336	222		59	2		740
Accessory boats									88
Apparatus:									
Number	259	10	783	509	51	176	2		
Yards at mouth	309	34							

Fisheries of New Jersey, 1933—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines	
	Menhaden		Other			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					4,450	$66
Bluefish			76,085	$3,053	1,100	66
Butterfish			55	2		
Carp					35,871	4,003
Catfish and bullheads					19,300	915
Croaker			3,707	69	15,100	409
Eels, common					53,001	3,338
Flounders			7,828	152	41,050	2,562
Herring, round					750	8
Kingfish or "king mackerel"			60	1		
King whiting or "kingfish"			53	2	1,300	86
Mackerel			1,350	34		
Menhaden	40,557,900	$73,561	2,890,800	7,207		
Mullet					82,480	6,226
Mummichog					10,100	445
Scup or porgy			407,241	2,576		
Sea bass			437	17		
Shad					66,709	7,803
Silversides					4,330	626
Spanish mackerel			5	1		
Spot					2,000	80
Squeteague or "sea trout", gray			367,309	5,448	49,612	2,763
Striped bass					1,200	280
Suckers					101,600	8,395
Thimble-eyed mackerel			300	6		
Tuna or "horse mackerel"			44	2		
White perch					5,500	487
Crabs:						
Hard					2,355	144
Soft					16,881	3,101
Shrimp					400	80
Total	40,557,900	73,561	3,755,274	18,570	515,089	41,883

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							5,800	$143
Bluefish	1,000	$50	15,719	$1,020	159,842	$6,877	6,425	361
Bonito					1,114	78		
Butterfish			825	34	1,543	62		
Croaker			113,806	2,068	33,952	939	1,500	80
Mackerel			175,968	4,890	13,131	421		
Scup or porgy					2,292	46		
Shad	638	85	75,772	10,989	19	2	251,211	20,703
Spot			55,000	1,430	11,520	330	7,500	375
Squeteague or "sea trout", gray	750	38	91,865	2,149	74,143	3,614	6,314	289
Striped bass			1,780	300			3,795	692
Sturgeon			498	98				
White perch							10,300	1,200
Whiting					45	1		
Crabs, soft			801	100				
Total	2,388	173	532,034	23,078	297,601	12,370	292,845	23,843

Fisheries of New Jersey, 1933—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Trawl		Troll		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	1,062,418	$31,076			446,992	$20,176		
Bonito	8,180	413			9,832	734		
Cero	2,500	75						
Cod	28,355	834	2,543,028	$80,294				
Croaker	20,500	930						
Dolphin					111	9		
Eels, common	2,200	141						
Flounders	12,769	464	6,533	357				
Grayfish			1,500	30				
Hake			409	14				
King whiting or "kingfish"	31	3						
Scup or porgy	31,458	393						
Sea bass	342,430	16,017						
Sharks			539	8				
Skates			4,838	25				
Spanish mackerel	5,600	168						
Squeteague or "sea trout", gray	60,816	2,659						
Striped bass	400	40						
Tautog	5,635	412						
Tuna or "horse mackerel"	1,063	81			3,324	157		
Crabs:								
Hard							102,102	$2,913
Soft							1,200	225
Total	1,584,385	53,706	2,556,847	80,728	460,259	21,076	103,302	3,138

Species	Pound nets		Weirs		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							3,740	$35
Bluefish	335,143	$12,752						
Bonito	69,281	2,878						
Butterfish	2,811,867	114,175						
Carp					167,200	$11,996		
Catfish and bullheads					2,000	120	34,080	2,286
Cod	642,251	18,207						
Crevalle	7,254	141						
Croaker	786,492	21,271						
Drum, red or redfish	6,498	101						
Eels:								
Common	20,702	1,914					30,562	2,706
Conger	2,029	112						
Flounders	386,831	20,237					68,283	1,771
Frigate mackerel	19,754	243						
Goosefish	10,000	38						
Grayfish	5,239	105						
Herring, sea	590,465	5,171						
King whiting or "kingfish"	72,140	10,437						
Mackerel	119,861	3,942						
Menhaden	2,325,061	42,159						
Mummichog							500	100
Pollock	6,280	94						
Pompano	317	77						
Scup or porgy	3,708,969	39,041					55	1
Sea bass	198,523	6,622					4,237	150
Sea robin	10,805	109						
Shad	63,109	5,599						
Sharks	9,071	195						
Skates	74,976	632						
Spanish mackerel	814	118						
Spot	387,662	4,565						
Squeteagues or "sea trout", gray	6,140,500	162,415						
Squirrel hake	52,765	402						
Striped bass	420	31					1,500	423
Sturgeon	372	70						
Suckers					975	67		
Tautog	56,969	9,533						
Thimble-eyed mackerel	25,175	368						
Tuna or "horse mackerel"	32,061	1,416						
White perch	500	25					13,120	954
Whiting	2,040,499	20,133						
Crabs:								
Hard	9,600	64						
King	1,269,600	3,326	893,336	$2,485			7,500	80
Lobsters	2,610	470						
Squid	337,000	8,480						
Turtles, snapper							1,750	175
Total	22,639,465	517,668	893,336	2,485	110,175	12,183	165,327	8,681

Fisheries of New Jersey, 1933—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Cast nets		Drag nets		Otter trawls		Wire baskets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							10, 550	$715		
Butterfish							97, 924	5, 046		
Carp			400	$48						
Cod							16, 252	353		
Croaker							926, 016	19, 179		
Drum, red or redfish							2, 272	25		
Eels, conger							9, 134	320		
Flounders							3, 528, 407	145, 053		
Hake							21, 762	346		
Kingfish or "king mackerel"							80	4		
King whiting or "kingfish"							10, 515	404		
Mackerel							7, 737	405		
Menhaden							356	2		
Mullet							267	8		
Pigfish							203	5		
Scup or porgy							731, 349	23, 236		
Sea bass							257, 214	9, 889		
Sheepshead							9	1		
Skates							3, 162	55		
Spot							9, 883	178		
Squeteague or "sea trout":										
Gray							136, 072	6, 222		
Spotted							30	2		
Striped bass							27	4		
Sturgeon							25, 843	1, 962		
Tautog							1, 617	34		
Tilefish							25	1		
Crabs:										
Hard	17, 658	$1, 778					60	1		
Soft	31, 539	7, 649							1, 341	$168
Lobsters							1, 749	215		
Shrimp					9, 500	$2, 375	15, 841	873		
Periwinkles and cockles							100	2		
Scallops:										
Bay							594	30		
Sea							1, 589	102		
Squid							10, 312	280		
Total	49, 197	9, 427	400	48	9, 500	2, 375	5, 826, 951	214, 952	1, 341	168

Species	Pots						Harpoons		Spears	
	Crab		Eel		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			124, 683	$9, 899					105, 318	$10, 567
Flounders					96	$5				
Mummichog			15, 325	1, 394						
Sea bass					1, 166, 302	30, 906				
Silversides			500	50						
Swordfish							1, 600	$128		
Tautog					6, 702	69				
Crabs:										
Hard	12, 000	$750			2, 280	438				
Soft	4, 800	900								
Lobsters					359, 861	66, 944				
Total	16, 800	1, 650	140, 508	11, 343	1, 535, 241	98, 362	1, 600	128	105, 318	10, 657

Fisheries of New Jersey, 1933—Continued

CATCH: BY GEAR—Continued

Species	Dredges								Tongs	
	Clam		Crab		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard			561, 753	$12, 220						
Clams:										
Hard, public	23, 443	$3, 333			2, 625	$375			760, 636	$115, 843
Hard, private	63, 143	7, 027			1, 336	550			5, 107	1, 021
Surf or skimmers	140, 063	5, 482								
Conchs	54	2								
Oysters:										
Market, public, spring									10, 330	992
Market, public, fall									25, 589	1, 601
Market, private, spring					3,622,470	269, 885			56, 919	7, 676
Market, private, fall					3,668,151	275, 843			137, 834	18, 419
Scallops, sea							372, 000	$22, 300		
Total	226, 703	15, 844	561, 753	12, 220	7,294,582	546, 653	372, 000	22, 300	996, 415	145, 552

Species	Rakes		Forks		Hoes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:										
Hard	1, 602	$48								
King									13, 336	$40
Soft	801	96								
Clams:										
Hard, public	531, 283	81, 480							87, 217	14, 548
Hard, private	875	123								
Soft, public					913, 560	$45, 752				
Surf or skimmers	6, 250	250								
Mussels, sea									5, 200	200
Oysters:										
Market, public, spring	198	96							438	50
Market, public, fall	580	141							437	50
Market, private, spring	38, 725	5, 272							425	50
Market, private, fall	47, 963	6, 756							1, 616	270
Terrapin, diamond-back									502	145
Turtles, snapper							750	$75		
Bloodworms			1, 740	$1, 505						
Sandworms			5, 403	4, 645						
Total	628, 277	94, 262	7, 143	6, 150	913, 560	45, 752	750	75	109, 171	15, 353

OPERATING UNITS: BY COUNTIES

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	64	3	6		288	593	
On boats and shore:							
Regular	217	8	34		154	39	2
Casual	211	47	102	17	342	143	19
Total	492	58	142	17	784	775	21
Vessels:							
Motor	15	1	2		51	97	
Net tonnage	225	15	22		839	1, 877	
Boats:							
Motor	184	13	62	1	192	46	5
Other	178	13	35	8	149	95	7
Accessory boats	7				56		

Fisheries of New Jersey, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Apparatus:							
Purse seines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Menhaden					1		
Length, yards					456		
Other	1				6		
Length, yards	360				2, 150		
Haul seines	25		20	4	10	8	3
Length, yards	2, 045		1, 811	400	495	800	240
Gill nets:							
Drift	71	1	18	7	124	78	
Square yards	22, 680	1, 998	20, 450	840	41, 368	61, 997	
Runaround	1				4	4	
Square yards	4, 800				7, 200	1, 200	
Stake		13	4		9	69	
Square yards		15, 390	106		1, 300	8, 120	
Lines:							
Hand	39				209	16	
Hooks	65				374	22	
Trawl	137				303	9	
Hooks	82, 100				198, 850	5, 400	
Troll	4				268		
Hooks	4				268		
Trot with baits or snoods						8	
Baits or snoods						9, 700	
Pound nets	2				63		
Weirs					62	26	
Stop nets			8	5		8	10
Square yards			2, 920	495		7, 500	18, 600
Fyke nets	21		278	15	121	174	40
Dip nets	4				6	1	
Cast nets							1
Otter trawls	23				40		
Yards at mouth	540				872		
Pots:							
Eel	6	105			207	32	
Lobster					470		
Spears	2				3		
Dredges:							
Clam	3				6	14	
Yards at mouth	3				6	18	
Crab		12				20	
Yards at mouth		12				30	
Oyster	10		16		2	192	
Yards at mouth	11		16		3	236	
Scallop	4						
Yards at mouth	14						
Tongs	304		53		165	58	
Rakes	201		25		136		
Hoes	2						
Gaffs						2	

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Nnmber*	*Number*	*Number*
On vessels	2			2	162	147	
On boats and shore:							
Regular				6	298	193	3
Casual		24	26	11	323	265	92
Total	2	24	26	19	783	605	95
Vessels:							
Motor	1			1	14	26	
Net tonnage	9			8	276	199	
Sail					3		
Net tonnage					24		
Total vessels	1			1	17	26	
Total net tonnage	9			8	300	199	
Boats:							
Motor				7	200	281	38
Other		5	7	3	157	68	15

Fisheries of New Jersey, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Accessory boats	--------	--------	--------	--------	25	--------	--------
Apparatus:							
Purse seines:							
Menhaden	--------	--------	--------	--------	7	--------	--------
Length, yards	--------	--------	--------	--------	2,350	--------	--------
Haul seines	--------	5	4	--------	13	5	8
Length, yards	--------	1,005	740	--------	253	281	970
Gill nets:							
Anchor	--------	--------	--------	3	7	--------	--------
Square yards	--------	--------	--------	2,500	3,330	--------	--------
Drift	--------	--------	--------	--------	275	--------	31
Square yards	--------	--------	--------	--------	106,320	--------	192,680
Runaround	--------	--------	--------	6	36	18	--------
Square yards	--------	--------	--------	15,895	98,800	82,800	--------
Stake	--------	--------	--------	--------	4	152	--------
Square yards	--------	--------	--------	--------	5,360	16,606	--------
Lines:							
Hand	--------	--------	--------	--------	151	46	2
Hooks	--------	--------	--------	--------	202	53	4
Trawl	--------	--------	--------	--------	97	166	--------
Hooks	--------	--------	--------	--------	50,100	83,950	--------
Troll	--------	--------	--------	--------	96	36	--------
Hooks	--------	--------	--------	--------	96	36	--------
Trot with baits or snoods	--------	--------	--------	--------	--------	--------	1
Baits or snoods	--------	--------	--------	--------	--------	--------	200
Pound nets	--------	--------	--------	--------	47	41	--------
Stop nets	--------	--------	--------	--------	--------	--------	33
Square yards	--------	--------	--------	--------	--------	--------	21,100
Fyke nets	--------	--------	15	--------	92	517	96
Dip nets	--------	--------	--------	--------	19	4	--------
Cast nets	--------	--------	--------	--------	--------	--------	2
Drag nets	--------	--------	--------	--------	--------	14	--------
Yards at mouth	--------	--------	--------	--------	--------	28	--------
Otter trawls	1	--------	--------	--------	3	--------	--------
Yards at mouth	27	--------	--------	--------	75	--------	--------
Wire baskets	--------	--------	--------	--------	--------	12	--------
Pots:							
Crab	--------	--------	--------	--------	--------	--------	10
Eel	--------	--------	--------	195	1,158	868	--------
Lobster	--------	--------	--------	345	16,887	10,369	--------
Harpoons	--------	--------	--------	--------	1	--------	--------
Spears	--------	--------	--------	--------	74	13	--------
Dredges:							
Clam	--------	--------	--------	4	16	--------	--------
Yards at mouth	--------	--------	--------	5	16	--------	--------
Crab	--------	--------	--------	--------	37	--------	--------
Yards at mouth	--------	--------	--------	--------	48	--------	--------
Oyster	--------	--------	--------	--------	--------	39	--------
Yards at mouth	--------	--------	--------	--------	--------	43	--------
Scallop	--------	--------	--------	--------	6	--------	--------
Yards at mouth	--------	--------	--------	--------	20	--------	--------
Tongs	--------	--------	--------	--------	4	199	--------
Rakes	--------	--------	--------	--------	36	111	--------
Forks	--------	--------	--------	3	48	--------	--------
Hoes	--------	--------	--------	--------	174	--------	--------

CATCH: BY COUNTIES

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	--------	--------	--------	--------	150	$4	--------	--------	--------	--------
Bluefish	175,050	$7,072	--------	--------	--------	--------	--------	--------	599,782	$25,844
Bonito	550	22	--------	--------	--------	--------	--------	--------	15,626	849
Butterfish	9,279	399	--------	--------	--------	--------	--------	--------	764,404	24,888
Carp	--------	--------	--------	--------	15,471	1,661	8,500	$850	--------	--------
Catfish and bullheads	4,050	122	--------	--------	14,470	1,300	1,000	80	--------	--------
Cero	--------	--------	--------	--------	--------	--------	--------	--------	2,500	75
Cod	553,995	21,149	--------	--------	--------	--------	--------	--------	1,256,165	39,697
Croaker	67,548	1,198	--------	--------	1,050	21	--------	--------	1,121,482	21,814
Dolphin	--------	--------	--------	--------	--------	--------	--------	--------	111	9
Drum, red or redfish	--------	--------	--------	--------	--------	--------	--------	--------	5,272	55

Fisheries of New Jersey, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels:										
Common	68, 100	$4, 236	6, 500	$303	8, 112	$610	1, 000	$150	23, 108	$2, 543
Conger	3, 771	72							5, 363	248
Flounders	1, 182, 122	47, 772							2, 323, 790	98, 570
Frigate mackerel									405	4
Hake	6, 066	93							15, 705	254
Herring:										
Round	750	8								
Sea	7, 500	75							9, 580	94
Kingfish or "king mackerel"	60	1							80	4
King whiting or "kingfish"	2, 980	136							31, 431	1, 205
Mackerel	6, 453	224							12, 290	673
Menhaden									8, 603, 761	21, 545
Mullet	27, 600	1, 656							51, 267	4, 158
Mummichog	8, 000	200					500	100	2, 225	84
Pigfish									203	5
Pollock									380	10
Pompano	200	24								
Scup or porgy	76, 367	1, 299							2, 095, 045	30, 147
Sea bass	155, 448	4, 939							467, 152	22, 086
Shad	1, 960	124	171, 024	12, 573	11, 249	2, 020	2, 330	405	10, 818	931
Sharks									2, 965	26
Sheepshead									9	1
Skates									12, 904	122
Spanish mackerel	5	1							5, 675	180
Spot	2, 434	89							31, 767	811
Squeteagues or "sea trout":										
Gray	295, 903	5, 673			2, 562	143			2, 353, 679	54, 400
Spotted									30	2
Squirrel hake									3, 000	16
Striped bass	2, 037	482			650	195			610	61
Sturgeon	131	9							26, 074	2, 021
Suckers	850	26			59, 100	4, 513	150	11		
Tautog	224	3							2, 130	46
Thimble-eyed mackerel									9, 004	92
Tilefish									25	1
Tuna or "horse mackerel"	192	4							3, 376	160
White perch	6, 850	568			2, 100	210				
Whiting	3, 000	15							10, 964	64
Crabs:										
Hard	6, 525	337	23, 001	690					3, 471	177
King									1, 920, 272	5, 243
Soft	942	113							933	112
Lobsters	554	79							1, 195	136
Shrimp	841	123							15, 000	750
Clams:										
Hard, public	446, 134	71, 434			94, 106	13, 229			285, 557	53, 333
Hard, private	875	185			1, 094	154				
Soft, public	2, 000	250								
Surf or skimmer	77, 563	2, 982							68, 750	2, 750
Conchs									54	2
Mussels, sea									5, 200	200
Oysters:										
Market, public, spring									2, 796	546
Market, public, fall	425	58							197	96
Market, private, spring	113, 900	14, 992			108, 801	13, 500			21, 468	1, 907
Market, private, fall	199, 291	26, 474			108, 801	13, 500			18, 508	1, 626
Periwinkles and cockles									100	2
Scallops:										
Bay									594	30
Sea	150, 170	7, 542							1, 419	60
Squid	564	18							198, 648	5, 179
Total	3, 669, 259	222, 278	200, 525	13, 566	427, 716	51, 060	13, 480	1, 596	22,424,319	425, 944

Fisheries of New Jersey, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Cumberland		Gloucester		Hudson		Hunterdon		Mercer	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,800	$170	2,000	$30	-------	-------	-------	-------	300	$5
Bluefish	5,000	440	-------	-------	-------	-------	-------	-------	-------	-------
Carp	13,750	1,316	28,950	3,764	-------	-------	350	$35	1,100	132
Catfish and bullheads	14,760	823	7,000	210	-------	-------	-------	-------	-------	-------
Cod	13,334	600	-------	-------	-------	-------	-------	-------	-------	-------
Croaker	20,500	760	-------	-------	-------	-------	-------	-------	-------	-------
Eels, common	11,200	696	700	70	-------	-------	-------	-------	1,750	300
Flounders	-------	-------	-------	-------	50,000	$1,500	-------	-------	-------	-------
Shad	45,814	6,310	410	43	-------	-------	25,359	2,500	31,833	3,969
Spot	65,000	1,730	-------	-------	-------	-------	-------	-------	-------	-------
Squeteagues or "sea trout", gray	103,064	2,478	-------	-------	-------	-------	-------	-------	-------	-------
Striped bass	5,055	816	-------	-------	-------	-------	-------	-------	-------	-------
Sturgeon	498	98	-------	-------	-------	-------	-------	-------	-------	-------
Suckers	-------	-------	400	28	-------	-------	8,000	480	34,000	3,400
White perch	10,500	1,186	-------	-------	-------	-------	-------	-------	-------	-------
Crabs:										
Hard	471,567	7,073	-------	-------	-------	-------	-------	-------	-------	-------
King	256,000	608	-------	-------	-------	-------	-------	-------	-------	-------
Soft	876	131	-------	-------	-------	-------	-------	-------	-------	-------
Clams:										
Hard, public	4,375	930	-------	-------	-------	-------	-------	-------	-------	-------
Hard, private	63,143	7,027	-------	-------	-------	-------	-------	-------	-------	-------
Oysters:										
Market, public, spring	7,200	480	-------	-------	-------	-------	-------	-------	-------	-------
Market, public, fall	23,400	1,235	-------	-------	-------	-------	-------	-------	-------	-------
Market, private, spring	3,408.582	241,928	-------	-------	-------	-------	-------	-------	-------	-------
Market, private, fall	3,412,176	242,167	-------	-------	-------	-------	-------	-------	-------	-------
Terrapin, diamond-back	502	145	-------	-------	-------	-------	-------	-------	-------	-------
Turtles, snapper	2,500	250	-------	-------	-------	-------	-------	-------	-------	-------
Total	7,966,596	519,397	39,460	4,145	50,000	1,500	33,709	3,015	68,983	7,806

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	-------	-------	1,500	$10	2,240	$25	-------	-------
Bluefish	81,931	$3,647	678,703	26,328	574,838	12,815	-------	-------
Bonito	-------	-------	24,701	1,325	47,530	1,907	-------	-------
Butterfish	-------	-------	556,743	23,459	1,581,788	70,573	-------	-------
Carp	-------	-------	-------	-------	-------	-------	75,350	$8,289
Catfish and bullheads	-------	-------	-------	-------	-------	-------	14,100	786
Cod	-------	-------	572,666	17,035	833,726	21,207	-------	-------
Crevalle	-------	-------	2,200	39	5,054	102	-------	-------
Croaker	15,031	489	194,369	10,820	472,093	9,443	9,000	400
Drum, red or redfish	-------	-------	538	11	2,960	60	-------	-------
Eels:								
Common	4,375	334	156,753	15,196	51,868	3,837	3,000	290
Conger	-------	-------	2,029	112	-------	-------	-------	-------
Flounders	-------	-------	367,039	18,149	128,846	4,610	-------	-------
Frigate mackerel	-------	-------	13,911	139	5,438	100	-------	-------
Goosefish	-------	-------	10,000	38	-------	-------	-------	-------
Grayfish	-------	-------	6,739	135	-------	-------	-------	-------
Hake	-------	-------	400	13	-------	-------	-------	-------
Herring, sea	-------	-------	307,225	3,072	266,160	1,930	-------	-------
King whiting or "kingfish"	-------	-------	20,867	8,151	28,761	1,440	-------	-------
Mackerel	-------	-------	254,300	6,993	45,004	1,802	-------	-------
Menhaden	-------	-------	36,967,308	99,897	203,048	1,487	-------	-------
Mullet	-------	-------	3,880	420	-------	-------	-------	-------
Mummichog	3,650	365	11,350	1,170	200	20	-------	-------
Pollock	-------	-------	3,195	42	2,705	42	-------	-------
Pompano	-------	-------	117	53	-------	-------	-------	-------
Scup or porgy	-------	-------	1,308,771	19,836	1,401,181	14,011	-------	-------
Sea bass	-------	-------	224,086	8,200	1,122,457	28,376	-------	-------
Sea robin	-------	-------	4,705	47	6,109	62	-------	-------
Shad	276	52	119,267	11,519	21,470	1,900	15,648	2,835
Sharks	-------	-------	6,645	177	-------	-------	-------	-------
Silversides	-------	-------	3,930	426	900	250	-------	-------
Skates	-------	-------	38,900	453	31,172	137	-------	-------
Spanish mackerel	-------	-------	232	29	507	77	-------	-------
Spot	-------	-------	219,014	2,777	155,350	1,551	-------	-------
Squeteagues or "sea trout", gray	27,594	1,538	1,453,449	51,055	2,687,505	70.090	3.625	220

Fisheries of New Jersey, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squirrel hake			35, 233	$241	14, 532	$145		
Striped bass					450	120	320	$96
Sturgeon			10	2				
Suckers							75	4
Swordfish			1, 600	128				
Tautog			40, 290	9, 283	28, 279	716		
Thimble-eyed mackerel			8, 908	129	7, 563	153		
Tuna or "horse mackerel"			17, 991	932	14, 933	560		
White perch			20	2	9, 950	700		
Whiting			1, 284, 816	12, 769	741, 764	7, 286		
Crabs:								
Hard			188, 646	8, 616	1, 200	525	15, 000	938
King			7, 500	80				
Soft			43, 263	9, 780	5, 349	978	6, 000	1, 125
Lobsters	848	$213	342, 123	62, 526	19, 500	4, 675		
Shrimp					9, 900	2, 455		
Clams:								
Hard, public	9, 513	1, 440	101, 346	12, 409	464, 173	62, 804		
Hard, private			2, 700	620	2, 649	735		
Soft, public			911, 560	45, 502				
Oysters:								
Market, public, spring					970	112		
Market, public, fall					2, 584	403		
Market, private, spring			750	150	65, 038	10, 406		
Market, private, fall			750	150	116, 038	17, 371		
Scallops, sea			222, 000	14, 800				
Squid			36, 145	1, 322	111, 955	2, 241		
Bloodworms	6	8	1, 734	1, 497				
Sandworms	3	3	5, 400	4, 642				
Total	143, 227	8, 089	46, 788, 317	512, 706	11, 295, 728	360, 239	142, 118	14, 983

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Rakes		By hand		Total, exclusive of duplication	
OPERATING UNITS										
Fishermen:	*Number*		*Number*		*Number*		*Number*		*Number*	
On vessels	1, 514								1, 514	
On boats and shore:										
Regular			48		20				68	
Casual			92		14		1		107	
Total	1, 514		140		34		1		1, 689	
essels, sail	139								139	
Net tonnage	2, 881								2, 881	
Boats:										
VMotor			60		26				86	
Other			73		8				81	
Apparatus:										
Number	278		140		34					
Yards at mouth	333									
CATCH										
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	860, 500	$216, 125	56, 855	$14, 282	8, 545	$2, 125	100	$50	926, 000	$232, 582
Seed, public, fall			11, 000	2, 750					11, 000	2, 750
Total	860, 500	216, 125	67, 855	17, 032	8, 545	2, 125	100	50	937, 000	235, 332

Fisheries of New Jersey, 1933—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Atlantic		Burlington		Cumberland		Ocean	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels					1,514			
On boats and shore:								
Regular	26		20		20		2	
Casual	3		30		70		4	
Total	29		50		1,604		6	
Vessels, sail					139			
Net tonnage					2,881			
Boats:								
Motor	23		45		14		4	
Other	5		3		72		1	
Apparatus:								
Dredges					278			
Yards at mouth					333			
Tongs	19		26		90		5	
Rakes	10		24					
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	5,775	$1,427	13,150	$3,287	905,650	$227,455	1,425	$413
Seed, public, fall					11,000	2,750		
Total	5,775	1,427	13,150	3,287	916,650	230,205	1,425	413

NOTE.—Of the total number of persons fishing for seed oysters, 1,583 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated; 80 sail vessels, 79 motor boats, 61 other boats, 160 dredges, and 108 tongs.

PENNSYLVANIA

Fisheries of Pennsylvania, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines, drift	Gill nets	Total, exclusive of duplication
	Number	*Number*	*Number*
Fishermen, on boats and shore, casual	39	14	53
Boats:			
Motor		5	5
Other	12	2	14
Apparatus:			
Number	12	7	
Length, yards	1,635		
Square yards		5,200	

CATCH: BY GEAR

Species	Haul seines		Gill nets, drift	
	Pounds	*Value*	*Pounds*	*Value*
Alewives	8,775	$88		
Carp	640	64		
Shad	1,352	251	865	$141
Suckers	40,600	2,436		
Total	51,367	2,839	865	141

Fisheries of Pennsylvania, 1933—Continued

OPERATING UNITS: BY COUNTIES

Item	Bucks	Philadelphia
	Number	*Number*
Fishermen, on boats and shores, casual	43	10
Boats:		
Motor		5
Other	14	
Apparatus:		
Haul seines	12	
Length, yards	1,635	
Gill nets, drift	2	5
Square yards	900	4,300

CATCH: BY COUNTIES

Species	Bucks		Philadelphia	
	Pounds	*Value*	*Pounds*	*Value*
Alewives	8,775	$88		
Carp	640	64		
Shad	1,515	278	702	$114
Suckers	40,600	2,436		
Total	51,530	2,866	702	114

DELAWARE

Fisheries of Delaware, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines		Pound nets	Stop nets
			Drift	Run-around	Stake	Hand	Trawl		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	282								
On boats and shore:									
Regular		13	11	12	6	7	2		
Casual		217	82	32	18	5		24	12
Total	282	230	93	44	24	12	2	24	12
Vessels:									
Steam	10								
Net tonnage	1,237								
Boats:									
Motor			25	16	4	5		1	
Other		61	26	15	12	7	2	11	7
Accessory boats	30								
Apparatus:									
Number	10	61	63	33	99	12	2	32	7
Length, yards	3,140	18,990							
Square yards			145,720	41,450	7,770				1,820
Hooks, baits or snoods						24	1,300		

Fisheries of Delaware, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Pots		Dredges			Tongs	By hand	Total, exclusive of duplication
			Eel	Lobster	Clam	Crab	Oyster			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels					41	19	41			350
On boats and shore:										
Regular	19	10	11							34
Casual	43	41	17	8	29			32	24	478
Total	62	51	28	8	70	19	41	32	24	862
Vessels:										
Steam										10
Net tonnage										1,237
Motor					12	6	7			16
Net tonnage					153	99	110			229
Sail							1			1
Net tonnage							8			8
Total vessels					12	6	8			27
Total net tonnage					153	99	118			1,474
Boats:										
Motor	8		3	4	13			8		77
Other	40	23	16					24		181
Apparatus:										
Number	449	51	876	165	33	11	16	32		
Yards at mouth					47	20	23			

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines		Gill nets					
					Drift		Run-around		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			879,720	$2,179	17,260	$183			215,460	$2,056
Bluefish					3,400	170			420	22
Carp			11,240	685						
Catfish and bullheads			420	20						
Croaker			31,160	487	19,260	307	11,540	$180	680	9
Flounders			1,130	62					6,240	326
Menhaden	33,600,000	$111,700								
Mullet							233,000	2,390		
Shad			2,310	242	19,720	1,715			280	34
Spot			13,920	373	15,600	478	2,400	52		
Squeteagues or "sea trout", gray			90,580	2,565	12,400	184	9,290	144	9,460	415
Striped bass			2,220	301	860	105			7,540	861
Sturgeon					1,200	300				
White perch			14,380	725	1,620	90			4,900	222
Whiting			480	30						
Yellow perch			4,740	294						
Total	33,600,000	111,700	1,052,300	7,963	91,320	3,532	256,230	2,766	244,980	3,945

Species	Lines				Pound nets		Stop nets	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					22,400	$150		
Bluefish	900	$44						
Carp							2,220	$136
Catfish and bullheads							180	12
Cod			2,240	$69				
Croaker	4,490	85						
Drum, red or redfish	520	16						
Eels, common					840	59		
Flounders					240	12		
Squeteagues or "sea trout", gray	1,450	33						
Striped bass					360	38		
White perch					3,240	154		
Crabs, king					506,600	529		
Total	7,360	178	2,240	69	533,680	942	2,400	148

Fisheries of Delaware, 1933—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Pots			
					Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	14,140	$218						
Carp	12,960	768						
Catfish and bullheads	1,245	84						
Eels, common	9,900	572			42,400	$3,261		
Flounders	1,840	92						
Shad	15	2						
Striped bass	720	77						
White perch	6,510	299						
Yellow perch	1,740	104						
Crabs, soft			36,000	$7,200				
Lobsters							12,840	$2,568
Terrapin, diamond-back	250	160						
Turtles, snapper	8,504	679						
Total	57,824	3,055	36,000	7,200	42,400	3,261	12,840	2,568

Species	Dredges						Tongs		By hand	
	Clam		Crab		Oyster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:										
Hard			96,600	$1,295						
King									60,000	$66
Clams:										
Hard, public	150,500	$29,895	40,800	415						
Hard, private	2,640	538			7,000	$1,360				
Oysters:										
Market, public, spring							39,600	$5,140		
Market, private, spring					20,320	2,460	4,200	525		
Market, private, fall					165,240	20,065				
Terrapin, diamond-back									160	100
Total	153,140	30,433	137,400	1,710	192,560	23,885	43,800	5,665	60,160	166

OPERATING UNITS: BY COUNTIES

Item	Kent	New Castle	Sussex
	Number	*Number*	*Number*
Fishermen:			
On vessels	58		307
On boats and shore:			
Regular	2	3	29
Casual	179	48	251
Total	239	51	587
Vessels:			
Steam			10
Net tonnage			1,237
Motor	14		3
Net tonnage	195		204
Sail	1		
Net tonnage	8		
Total vessels	15		13
Total net tonnage	203		1,441
Boats:			
Motor	31	10	36
Other	56	20	105
Accessory boats			30
Apparatus:			
Purse seines, menhaden			10
Length, yards			3,140
Haul seines	18	10	33
Length, yards	6,940	770	11,280

Fisheries of Delaware, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	New Castle	Sussex
Apparatus—Continued.			
Gill nets:	*Number*	*Number*	*Number*
Drift	7	18	38
Square yards	11,200	102,800	31,720
Runaround	3		30
Square yards	8,600		32,850
Stake	46		53
Square yards	5,120		2,650
Lines:			
Hand			12
Hooks			24
Trawl			2
Hooks			1,300
Pound nets	15		17
Stop nets	2	5	
Square yards	800	1,020	
Fyke nets	80	122	247
Dip nets			51
Pots:			
Eel	30		846
Lobster			165
Dredges:			
Clam	29		4
Yards at mouth	41		6
Crab	7		4
Yards at mouth	13		7
Oyster	14		2
Yards at mouth	20		3
Tongs	26		6

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,580	$18	1,800	$23	1,145,600	$4,745
Bluefish					4,720	236
Carp	4,540	240	18,400	1,185	3,480	164
Catfish and bullheads	125	6	1,080	71	640	39
Cod					2,240	69
Croaker	23,500	307			43,630	761
Drum, red or redfish					520	16
Eels, common	2,160	86	7,640	382	43,340	3,424
Flounders					9,450	492
Menhaden					33,600,000	111,700
Mullet					233,000	2,390
Shad	295	36	7,260	718	14,770	1,239
Spot	9,080	265			22,840	638
Squeteague or "sea trout", gray	77,270	2,398			45,910	943
Striped bass	2,740	363	40	6	8,920	1,013
Sturgeon			1,200	300		
White perch	6,060	295	600	44	23,990	1,151
Whiting			480	30		
Yellow perch			340	20	6,140	378
Crabs:						
Hard	44,600	545			52,000	750
King	566,600	595				
Soft					36,000	7,200
Lobsters					12,840	2,568
Clams:						
Hard, public	189,700	29,950			1,600	360
Hard, private	9,240	1,808			400	90
Oysters:						
Market, public, spring	27,600	3,540			12,000	1,600
Market, private, spring	24,520	2,985				
Market, private, fall	139,760	16,425			25,480	3,640
Terrapin, diamond-back	250	160	160	100		
Turtles, snapper	4,504	439	4,000	240		
Total	1,134,124	60,461	43,000	3,119	35,349,510	145,606

Fisheries of Delaware, 1933—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	48				48	
On boats and shore, casual	3		40		43	
Total	51		40		91	
Vessels, sail	7				7	
Net tonnage	96				96	
Boats, other than motor	1		40		41	
Apparatus:						
Number	16		40			
Yards at mouth	21					
CATCH	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Oysters, seed, public, spring	25,340	$6,330	9,600	$2,400	34,940	$8,730

SEED OYSTER FISHERY: BY COUNTIES

Item	Kent		Sussex	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	33		15	
On boats and shore, casual	37		6	
Total	70		21	
Vessels, sail	5		2	
Net tonnage	60		36	
Boats, other than motor	35		6	
Apparatus:				
Dredges	12		4	
Yards at mouth	16		5	
Tongs	34		6	
CATCH	*Bushels*	*Value*	*Bushels*	*Value*
Oysters, seed, public, spring	27,140	$6,780	7,800	$1,950

NOTE.—Of the total number of persons fishing for seed oysters, 56 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 6 sail vessels, 31 small boats other than motor, 12 dredges, and 31 tongs.

VESSEL FISHERIES AT NEW YORK CITY[7]

During 1933, fishing vessels of 5 net tons capacity or greater landed 24,455,000 pounds of fishery products at New York City. The landings consisted of bluefish, 2,467,000 pounds; bonito, 9,000 pounds; butterfish, 45,000 pounds; cod, 2,548,000 pounds; croaker, 4,000 pounds; eels, 3,000 pounds; flounders, 6,712,000 pounds; haddock, 8,209,000 pounds; hake, 5,000 pounds; halibut, 9,000 pounds; sea herring, 3,000 pounds; king whiting, 6,000 pounds; mackerel, 1,288,000 pounds; pollock, 5,000 pounds; scup, 212,000 pounds; sea bass, 159,000 pounds; swordfish, 3,000 pounds; tilefish, 1,621,000 pounds; and sea scallops, 2,147,000 pounds. Since the landings at Groton, Conn., were inconsiderable they have not been included with those at New York City as has been the custom in the past several years. Data on the landings at New York City are included also in the catch by States.

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[7] Statistics on the landings at New York City are collected by J. H. Matthews, executive secretary, Middle Atlantic Fisheries Association.

SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1933 was prosecuted by 317 fishermen who used 11 motor boats, 145 other boats, 2 haul seines having a combined length of 280 yards, 119 drift gill nets having a total area of 406,871 square yards, and 27 stake gill nets having a total area of 28,760 square yards. The total commercial catch amounted to 154,437 shad having a weight of 518,680 pounds and a value to the fishermen of $40,729. This is a decrease of 3 percent in the number of shad and 20 percent in their value as compared with 1932. The average price per pound received by the fishermen in 1933 was about 8 cents as compared with 10 cents in 1932.

Drift gill nets accounted for 61 percent of the weight of the shad taken while stake gill nets accounted for 39 percent. Small quantities, amounting to less than one-half of 1 percent, were taken by haul seines.

Statistics of the catch of shad in the Hudson River are included also in the catch data for New York and New Jersey which are published elsewhere in this report.

Shad fishery of the Hudson River, 1933

Item	New York			New Jersey			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen:									
On boats and shore:									
Regular	55			6			61		
Casual	212			44			256		
Total	267			50			317		
Boats:									
Motor				11			11		
Other	133			12			145		
Apparatus:									
Haul seines	2						2		
Length, yards	280						280		
Gill nets:									
Drift	118			1			119		
Square yards	404,873			1,998			406,871		
Stake	14			13			27		
Square yards	13,370			15,390			28,760		
Shad caught:									
With haul seines	576	1,670	$155				576	1,670	$155
With drift gill nets	96,411	314,693	25,182	150	524	$40	96,561	315,217	25,222
With stake gill nets	8,300	31,293	2,819	49,000	170,500	12,533	57,300	201,793	15,352
Total	105,287	347,656	28,156	49,150	171,024	12,573	154,437	518,680	40,729

FISHERIES OF THE CHESAPEAKE BAY STATES

(Area XXIII) [8]

The yield of the commercial fisheries of the Chesapeake Bay States (Maryland and Virginia) during 1933 amounted to 272,380,052 pounds, valued at $5,060,829 to the fishermen, representing a decrease of 24 percent in volume and 14 percent in value as compared with the catch in the previous year. These fisheries gave employment to 20,142 fishermen as compared with 20,946 in 1932.

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[8] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area, craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery, which extends into Area XXIV. Data on the operating units and catch of the fisheries of the Chesapeake Bay States have been taken largely from statistics collected by the State fishery agencies of Maryland and Virginia. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

There were 502 fishery wholesale and manufacturing establishments in the two States in 1933 as compared with 564 in 1931 when the most recent previous survey of such concerns was made. In 1933 these establishments employed 11,596 persons, paid $2,366,762 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $7,245,169. In 1931 the wholesale and manufacturing firms employed 12,333 persons, paid $2,802,420 in salaries and wages, and produced manufactured products, valued at $7,905,626.

Fisheries of the Chesapeake Bay States, 1933

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	13,498,490	$370,360	176,209,213	$1,685,109	189,707,703	$2,055,469
Shellfish, etc	41,863,299	1,363,495	40,809,050	1,641,865	82,672,349	3,005,360
Total	55,361,789	1,733,855	217,018,263	3,326,974	272,380,052	5,060,829

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	654	1,471	2,125
On boats and shore:			
Regular	5,559	7,073	12,632
Casual	2,314	3,071	5,385
Total	8,527	11,615	20,142
Vessels:			
Steam		25	25
Net tonnage		2,831	2,831
Motor		105	105
Net tonnage		1,761	1,761
Sail	154	3	157
Net tonnage	1,727	22	1,749
Total vessels	154	133	287
Total net tonnage	1,727	4,614	6,341
Boats:			
Motor	3,280	4,212	7,492
Other	2,316	3,621	5,937
Accessory boats		102	102
Apparatus:			
Purse seines:			
Menhaden		34	34
Length, yards		10,160	10,160
Haul seines	333	191	524
Length, yards	36,849	52,063	88,912
Gill nets:			
Anchor	74		74
Square yards	26,654		26,654
Drift	296	410	706
Square yards	367,311	337,045	704,356
Stake	3,683	4,913	8,596
Square yards	298,963	266,575	565,538
Lines:			
Hand	12		12
Hooks	24		24
Trot with baits or snoods	1,547	1,075	2,620
Baits or snoods	938,350	499,610	1,437,960
Pound nets	690	1,880	2,572
Stop nets		6	0
Square yards		10,300	10,300

Fisheries of the Chesapeake Bay States, 1933—Continued

OPERATING UNITS: BY STATES—Continued

Item	Maryland	Virginia	Total
Apparatus—Continued	*Number*	*Number*	*Number*
Fyke nets	2,181	649	2,830
Dip nets	1,458	1,675	3,133
Otter trawls		27	27
Yards at mouth		803	803
Pots, eel	8,835	35	8,870
Spears	2		2
Scrapes	642	41	683
Yards at mouth	642	41	683
Dredges:			
Crab		130	130
Yards at mouth		235	235
Oyster	418	298	716
Yards at mouth	454	339	793
Scallop		2	2
Yards at mouth		6	6
Tongs	4,753	3,748	8,501
Rakes	20	362	382
Picks		540	540

CATCH: BY STATES

Species	Maryland		Virginia		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6,549,673	$43,164	19,177,448	$86,766	25,727,121	$129,930
Black bass	76,491	5,725			76,491	5,725
Bluefish	118,700	8,106	684,359	27,029	803,059	35,135
Bonito	9,100	194	10,092	455	19,192	649
Butterfish	589,263	12,709	2,285,353	55,203	2,874,616	67,912
Cabio or crab eater	1,100	44	18,842	791	19,942	835
Carp	169,833	11,406	428,464	16,877	598,297	28,283
Catfish and bullheads	263,068	10,261	718,408	22,351	981,476	32,612
Cod	100	2	6,866	137	6,966	139
Crappie	1,379	52			1,379	52
Croaker	1,806,866	24,349	14,235,182	186,720	16,042,048	211,069
Dolphin	500	75			500	75
Drum:						
Black	42,000	350	80,480	1,594	122,480	1,944
Red or redfish	7,200	140	51,539	1,456	58,739	1,596
Eels	203,413	11,727	108,634	4,347	312,047	16,074
Flounders	69,564	3,194	1,083,413	52,031	1,152,977	55,225
Gizzard shad	27,504	584	116,820	2,399	144,324	2,983
Haddock			47	1	47	1
Hake			23,455	387	23,455	387
Harvestfish	19,535	831	160,050	3,585	179,585	4,416
Hickory shad	11,426	249	56,228	1,196	67,654	1,445
King whiting or "kingfish"	9,900	396	64,303	2,050	74,203	2,446
Mackerel	27,200	272	16,216	901	43,416	1,173
Menhaden			115,990,500	385,825	115,990,500	385,825
Mullet	20,100	1,206	44,541	1,648	64,641	2,854
Pigfish			60,765	520	60,765	520
Pike or pickerel	28,688	3,913	200	11	28,888	3,924
Pollock			25	1	25	1
Pompano			4,530	248	4,530	248
Scup	82,500	1,650	1,506,131	36,324	1,588,631	37,974
Sea bass	10,100	505	332,075	9,392	342,175	9,897
Sea robin	500	25			500	25
Shad	1,374,315	133,142	4,816,714	440,027	6,191,029	573,169
Sharks			10,225	159	10,225	159
Silver perch	1,062	22			1,062	22
Spanish mackerel	1,400	70	66,501	3,950	67,901	4,020
Spot	30,627	704	716,665	18,010	747,292	18,714
Squeteague or "sea trout":						
Gray	1,153,654	32,043	12,310,138	230,981	13,463,792	263,024
Spotted	8,263	497	164,415	12,997	172,678	13,494
Striped bass	313,795	37,739	518,900	63,474	832,695	101,213
Sturgeon	685	115	8,141	1,596	8,826	1,711
Suckers	7,559	277			7,559	277
Sunfish	2,112	42			2,112	42
Swellfish			1,065	53	1,065	53
Tautog	5,000	150	1,048	21	6,048	171
Thimble-eyed mackerel			11,250	169	11,250	169
White perch	285,870	15,802	247,420	9,828	533,290	25,630
Whiting	500	25			500	25
Yellow perch	167,945	8,603	71,765	3,599	239,710	12,202
Total	13,498,490	370,360	176,209,213	1,685,109	189,707,703	2,055,469

Fisheries of the Chesapeake Bay States, 1933—Continued

CATCH: BY STATES—Continued

Species	Maryland		Virginia		Total	
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:						
Hard	26, 648, 100	$331, 747	23, 911, 375	$283, 898	50, 559, 475	$615, 645
Soft	3, 449, 029	238, 401	2, 067, 957	143, 351	5, 516, 986	381, 752
Lobsters			131	2	131	2
Shrimp			371	20	371	20
Clams, hard, public	41, 536	3, 894	1, 169, 266	264, 258	1, 210, 802	268, 152
Oysters: [1]						
Market, public, spring	3, 328, 176	192, 478	1, 660, 049	95, 142	4, 988, 225	287, 620
Market, public, fall	7, 279, 200	477, 725	2, 632, 005	148, 189	9, 911, 205	625, 914
Market, private, spring	390, 125	43, 983	3, 756, 701	286, 440	4, 146, 826	330, 423
Market, private, fall	687, 283	74, 011	5, 419, 017	407, 284	6, 106, 300	481, 295
Scallops, sea			72, 645	8, 094	72, 645	8, 094
Squid	37, 500	750	107, 793	2, 627	145, 293	3, 377
Terrapin, diamond-back	1, 800	500	10, 240	2, 500	12, 040	3, 000
Turtles, snapper	550	6	1, 500	60	2, 050	66
Total	41, 863, 299	1, 363, 495	40, 809, 050	1, 641, 865	82, 672, 349	3, 005, 360
Grand total	55, 361, 789	1, 733, 855	217, 018, 263	3, 326, 974	272, 380, 052	5, 060, 829

[1] Statistics on oysters used in this table are based on yields of 6.57 pounds of meats to the bushel for market oysters in Maryland and 6.6 pounds in Virginia.

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maryland		Virginia		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard ……number	79, 944, 300	$331, 747	71, 734, 125	$283, 898	151, 678, 425	$615, 645
Soft ……do	13, 796, 116	238, 401	8, 271, 828	143, 351	22, 067, 944	381, 752
Clams, hard ……bushels	5, 192	3, 894	146, 158	264, 258	151, 350	268, 152
Oysters:						
Market, public, spring ……do	506, 572	192, 478	251, 523	95, 142	758, 095	287, 620
Market, public, fall ……do	1, 107, 945	477, 725	398, 789	148, 189	1, 506, 734	625, 914
Market, private, spring ……do	59, 380	43, 983	569, 197	286, 440	628, 577	330, 423
Market, private, fall ……do	104, 609	74, 011	821, 063	407, 284	925, 672	481, 295
Scallops, sea ……do			12, 107	8, 094	12, 107	8, 094

SEED OYSTER FISHERY

Item	Virginia	Item	Virginia	
OPERATING UNITS		CATCH		
		Oysters:	*Bushels*	*Value*
Fishermen:		Seed, public, spring	574, 620	$60, 880
On boats and shore:	*Number*	Seed, public, fall	815, 240	85, 934
Regular	1, 650	Seed, private, spring	35, 600	7, 720
Casual	67	Seed, private, fall	56, 800	11, 360
Total	1, 717	Total	1, 482, 260	165, 894
Boats:				
Motor	804			
Other	286			
Apparatus:				
Tongs	1, 474			
Rakes	130			

NOTE.—Of the number of persons fishing for seed oysters, 1,636 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 744 motor boats, 267 other boats, and 1,161 tongs.

Industries related to the fisheries of the Chesapeake Bay States, 1933

OPERATING UNITS, SALARIES, AND WAGES

Item	Maryland	Virginia	Total
Transporting:			
Persons engaged:	*Number*	*Number*	*Number*
On vessels	291	578	869
On boats		25	25
Total	291	603	894
Vessels:			
Motor	152	269	421
Net tonnage	2,177	2,752	4,929
Sail	11		11
Net tonnage	307		307
Total vessels	163	269	432
Total net tonnage	2,484	2,752	5,236
Boats		102	102
Wholesale and manufacturing:			
Establishments	308	194	502
Persons engaged:			
Proprietors	438	226	664
Salaried employees	175	140	315
Wage earners:			
Average for season	5,822	4,795	10,617
Average for year	2,707	1,997	4,704
Paid to salaried employees	$322,981	$157,830	$480,811
Paid to wage earners	$1,034,205	$851,746	$1,885,951
Total salaries and wages	$1,357,186	$1,009,576	$2,366,762
Fishermen's manufacturing	14		14

PRODUCTS MANUFACTURED

Item	Maryland		Virginia	
By manufacturing establishments:				
Alewives:				
Salted:	*Quantity*	*Value*	*Quantity*	*Value*
Corned ... pounds	108,500	$2,450	1,070,000	$17,297
Pickled [1] ... do	903,200	30,429	([2])	([2])
Tight-pack cut ... do	474,000	10,700	3,583,020	91,036
Tight-pack roe ... do	([2])	([2])	171,780	4,422
Canned ... standard cases	16,575	36,500	3,705	9,863
Roe, canned ... do	7,336	29,390	20,375	78,002
Dry scrap ... tons	([2])	([2])	524	13,137
Oil ... gallons	([2])	([2])	29,900	3,368
Butterfish, smoked ... pounds	92,500	23,400		
Chubs, cisco, and tullibee, smoked ... do	148,000	43,100		
Croaker, fresh fillets ... do			30,500	3,720
Flounders, fresh fillets ... do			30,000	5,040
Haddock, fresh fillets ... do			9,500	1,470
Menhaden products:				
Dry scrap and meal ... tons			13,846	434,647
Oil ... gallons			1,555,995	231,117
Salmon, smoked ... pounds	158,000	55,800		
Sea bass, fresh fillets ... do			62,000	7,900
Squeteagues, fresh fillets ... do			77,200	10,038
Sturgeon, smoked ... do	10,250	9,138		
Whitefish, smoked ... do	73,000	24,050		
Crabs, blue:				
Meat, packaged, fresh-cooked ... do	3,662,539	785,312	2,086,900	534,714
Dry scrap and meal ... tons	([2])	([2])	850	15,412
Oysters, fresh-shucked ... gallons	1,907,211	1,985,590	1,676,581	1,803,878
Oyster-shell products:				
Poultry feed ... tons	34,298	175,969	15,537	91,940
Lime ... do	20,998	30,017	11,576	37,595
Lime, "burned" ... do			3,314	22,948

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[1] This item is usually an intermediate product and, although included in the total, may be shown in its final stage of processing in this or another State.

[2] The production of this item is included under "Unclassified products".

Industries related to the fisheries of the Chesapeake Bay States, 1933—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maryland		Virginia	
	Quantity	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.				
Unclassified products:				
Fresh-packaged .... pounds..	(3)	(3)	[4] 64,438	[4] $10,315
Smoked .... do....	[5] 132,300	[5] $16,565	--------	--------
Scrap and meal .... tons..	[6] 588	[6] 7,640	[7] 972	[7] 16,635
Miscellaneous........	--------	[8] 501,368	--------	[9] 33,248
Total........	--------	3,767,427	--------	3,477,742
By fishermen:				
Alewives, salted, tight-pack cut .... pounds..	175,000	3,500	--------	--------
Sturgeon roe, salted .... do....	60	48	--------	--------
Total........	175,060	3,548	--------	--------
Grand total........	--------	3,770,975	--------	3,477,742

[3] This has been included under "Miscellaneous".
[4] Includes fresh fillets of cod, red drum, hake and Spanish mackerel, and fresh-shucked hard clams.
[5] Includes smoked alewives, carp, eels, shad, lake trout, kippered salmon, and sea herring bloaters.
[6] Includes alewife dry scrap and blue crab meal.
[7] Includes miscellaneous dry and acidulated scrap.
[8] Includes canned hard clam chowder and terrapin products; fresh-packaged alewife roe; salted tight-pack alewife roe; alewife oil; pearl essence; and marine shell products.
[9] Includes canned crab meat, pickled alewives, and miscellaneous oil.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, $7,245,169; and by fishermen, $3,548. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in transporting vessels and boats 295 have been included as fishermen and among the total number of persons engaged in the preparation of fishermen's prepared products, all have been included as fishermen.

MARYLAND

Fisheries of Maryland, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		Pound nets	Fyke nets
		Anchor	Drift	Stake	Hand	Trot with baits or snoods		
Fishermen:								
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular........	426	6	36	75	6	1,180	453	63
Casual........	390	10	262	148	--------	127	119	71
Total........	816	16	298	223	6	1,307	572	134
Boats:								
Motor........	139	7	68	77	3	1,257	233	53
Other........	300	4	117	116	--------	44	168	83
Apparatus:								
Number........	333	74	296	3,683	12	1,547	690	2,181
Length, yards........	36,849	--------	--------	--------	--------	--------	--------	--------
Square yards........	--------	26,654	367,311	298,963	--------	--------	--------	--------
Hooks, baits, or snoods........	--------	--------	--------	--------	24	938,350	--------	--------

Item	Dip nets	Pots, eel	Spears	Scrapes	Dredges, oyster	Tongs	Rakes	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels........	--------	--------	--------	--------	654	--------	--------	--------	654
On boats and shore:									
Regular........	985	80	2	397	83	3,821	20	--------	5,559
Casual........	473	61	--------	--------	--------	932	--------	15	2,314
Total........	1,458	141	2	397	737	4,753	20	15	8,527
Vessels, sail........	--------	--------	--------	--------	154	--------	--------	--------	154
Net tonnage........	--------	--------	--------	--------	1,727	--------	--------	--------	1,727
Boats:									
Motor........	100	79	2	--------	23	2,301	2	--------	3,280
Other........	1,343	86	--------	321	32	168	20	15	2,316
Apparatus:									
Number........	1,458	8,835	2	642	418	4,753	20	--------	--------
Yards at mouth........	--------	--------	--------	642	454	--------	--------	--------	--------

Fisheries of Maryland, 1933—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	65,550	$834	--------	--------	20,950	$368	19,700	$496
Black bass	47,967	3,667	--------	--------	--------	--------	1,345	81
Bluefish	17,130	1,086	--------	--------	49,000	4,200	4,080	243
Butterfish	8,000	520	--------	--------	--------	--------	--------	--------
Carp	143,618	9,988	--------	--------	510	17	1,100	47
Catfish and bullheads	60,020	2,134	--------	--------	19	1	1,295	57
Crappie	175	14	--------	--------	--------	--------	--------	--------
Croaker	317,373	5,431	--------	--------	8,200	250	12,708	390
Drum, red or redfish	2,700	40	--------	--------	--------	--------	--------	--------
Eels, common	1,314	68	--------	--------	--------	--------	40	2
Flounders	3,030	142	--------	--------	--------	--------	200	10
Gizzard shad	3,283	53	--------	--------	--------	--------	264	4
Hickory shad	--------	--------	--------	--------	160	3	108	11
Mullet	100	6	--------	--------	20,000	1,200	--------	--------
Pike or pickerel	15,241	1,994	--------	--------	--------	--------	1,031	154
Shad	5,918	616	19,600	$2,223	275,280	26,670	148,688	15,460
Silver perch	851	17	--------	--------	--------	--------	--------	--------
Spot	5,710	162	--------	--------	--------	--------	--------	--------
Squeteagues or "sea trout":								
Gray	148,603	7,653	--------	--------	3,500	158	2,240	108
Spotted	7,200	410	--------	--------	--------	--------	--------	--------
Striped bass	84,253	11,529	4,500	570	32,850	3,766	46,012	5,298
Sturgeon	--------	--------	--------	--------	285	35	--------	--------
Suckers	3,698	117	--------	--------	28	1	--------	--------
Sunfish	712	14	--------	--------	--------	--------	--------	--------
White perch	61,529	3,593	--------	--------	3,550	228	12,120	754
Whiting	500	25	--------	--------	--------	--------	--------	--------
Yellow perch	38,430	1,836	--------	--------	3,000	360	2,982	192
Crabs, soft	266,884	27,013	--------	--------	--------	--------	--------	--------
Turtles, snapper	50	3	--------	--------	--------	--------	--------	--------
Total	1,309,839	78,965	24,100	2,793	417,332	37,257	253,913	23,307

Species	Lines				Pound nets		Fyke nets	
	Hand		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	--------	--------	--------	--------	6,438,813	$41,357	4,660	$109
Black bass	--------	--------	--------	--------	325	26	26,854	1,951
Bluefish	10,000	$600	--------	--------	38,490	1,977	--------	--------
Bonito	400	20	--------	--------	8,700	174	--------	--------
Butterfish	--------	--------	--------	--------	581,263	12,189	--------	--------
Cabio or crab eater	--------	--------	--------	--------	1,100	44	--------	--------
Carp	--------	--------	--------	--------	12,532	615	12,073	739
Catfish and bullheads	--------	--------	--------	--------	94,997	3,592	106,737	4,477
Cod	--------	--------	--------	--------	100	2	--------	--------
Crappie	--------	--------	--------	--------	--------	--------	1,204	38
Croaker	--------	--------	--------	--------	1,464,512	18,193	4,073	85
Dolphin	500	75	--------	--------	--------	--------	--------	--------
Drum:								
Black	--------	--------	--------	--------	42,000	350	--------	--------
Red or redfish	--------	--------	--------	--------	4,500	100	--------	--------
Eels:								
Common	--------	--------	--------	--------	24,712	1,603	6,548	413
Other	200	2	--------	--------	50	1	--------	--------
Flounders	5,000	250	--------	--------	60,534	2,748	800	44
Gizzard shad	--------	--------	--------	--------	23,397	498	560	29
Harvestfish	--------	--------	--------	--------	19,535	831	--------	--------
Hickory shad	--------	--------	--------	--------	11,158	235	--------	--------
King whiting or "kingfish"	--------	--------	--------	--------	9,900	396	--------	--------
Mackerel	--------	--------	--------	--------	27,200	272	--------	--------
Pike or pickerel	--------	--------	--------	--------	1,134	171	11,282	1,594
Scup	2,500	50	--------	--------	80,000	1,600	--------	--------
Sea bass	10,000	500	--------	--------	100	5	--------	--------
Sea robin	--------	--------	--------	--------	500	25	--------	--------
Shad	--------	--------	--------	--------	924,829	88,173	--------	--------
Silver perch	--------	--------	--------	--------	111	3	100	2
Spanish mackerel	--------	--------	--------	--------	1,400	70	--------	--------
Spot	--------	--------	--------	--------	24,917	542	--------	--------
Squeteagues or "sea trout":								
Gray	--------	--------	--------	--------	996,111	23,930	3,200	194
Spotted	--------	--------	--------	--------	1,063	87	--------	--------
Striped bass	--------	--------	--------	--------	141,709	16,011	4,471	565
Sturgeon	--------	--------	--------	--------	400	80	--------	--------

Fisheries of Maryland, 1933—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Fyke nets	
	Hand		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Suckers					360	$9	3,473	$150
Sunfish							1,400	28
Tautog					5,000	150		
White perch					123,190	6,567	85,481	4,660
Yellow perch					11,259	686	112,274	5,529
Crabs, hard			25,543,900	$317,945				
Squid					37,500	750		
Turtles, snapper							500	3
Total	28,600	$1,497	25,543,900	317,945	11,213,401	224,062	385,690	20,610

Species	Dip nets		Pots, eel		Spears		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			164,549	$9,338	6,000	$300		
Crabs:								
Hard	88,300	$1,104					1,015,900	$12,698
Soft	2,441,379	166,937					740,766	44,451
Total	2,529,679	168,041	164,549	9,338	6,000	300	1,756,666	57,149

Species	Dredges, oyster		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public			24,640	$2,310	9,856	$924	7,040	$660
Oysters:								
Market, public, spring	627,196	$37,563	2,700,980	154,915				
Market, public, fall	1,104,010	76,510	6,175,190	401,215				
Market, private, spring	76,600	9,655	313,525	34,328				
Market, private, fall	95,384	11,655	591,899	62,356				
Terrapin, diamond-back							1,800	500
Total	1,903,190	135,383	9,806,234	655,124	9,856	924	8,840	1,160

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		46	12				170	
On boats and shore:								
Regular	534	20	212	2	55	112	773	13
Casual	366	60	94	46	88	244	198	55
Total	900	126	318	48	143	356	1,141	68
Vessels, sail		8	3				40	
Net tonnage		196	83				356	
Boats:								
Motor	338	30	132	2	52	154	514	25
Other	200	42	139	33	51	90	219	29
Apparatus:								
Haul seines	46	13	6	5	27	25	3	10
Length, yards	2,425	2,577	1,950	1,535	5,695	4,620	1,050	2,310
Gill nets:								
Anchor					74			
Square yards					26,654			
Drift	5			37	21	40	15	20
Square yards	400			1,690	45,912	125,744	18,733	43,159
Stake	15	81		1	113	1,202	261	310
Square yards	1,390	1,097		24	7,527	94,428	6,411	40,200
Lines:								
Trot with baits or snoods	77	41	43			19	548	
Baits or snoods	44,200	12,300	19,500			19,000	237,200	
Pound nets	35	10	19	9	41	40	170	6
Fyke nets	5	248		14	1,155	29		119
Dip nets	150	10	126			27	158	
Pots, eel	305	381		25	590	100	2,230	151
Dredges, oyster		16	6				88	
Yards at mouth		24	9				93	
Tongs	745		226			218	609	

Fisheries of Maryland, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	--------	364	62	--------	--------
On boats and shore:								
Regular	544	11	693	436	1,026	634	337	157
Casual	234	24	53	329	140	231	118	34
Total	778	35	746	765	1,530	927	455	191
Vessels, sail	--------	--------	--------	--------	87	16	--------	--------
Net tonnage	--------	--------	--------	--------	965	127	--------	--------
Boats:								
Motor	297	10	340	325	395	424	176	66
Other	175	16	117	235	598	211	43	118
Apparatus:								
Haul seines	105	9	75	4	3	1	1	--------
Length, yards	6,722	1,360	3,390	1,240	1,075	400	500	--------
Gill nets:								
Drift	87	8	--------	1	13	3	43	3
Square yards	69,600	12,385	--------	4,000	3,460	4,998	36,900	330
Stake	934	--------	9	--------	189	24	544	--------
Square yards	112,000	--------	1,080	--------	3,148	4,890	26,768	--------
Lines:								
Hand	--------	--------	--------	--------	--------	--------	--------	12
Hooks	--------	--------	--------	--------	--------	--------	--------	24
Trot with baits or snoods	189	--------	98	130	63	276	7	56
Baits or snoods	109,800	--------	72,250	117,000	50,400	206,300	5,600	44,800
Pound nets	26	6	13	75	50	122	23	45
Fyke nets	420	39	38	--------	23	45	42	4
Dip nets	100	--------	103	198	418	165	--------	3
Pots, eel	513	7	470	18	--------	3,895	--------	150
Spears	--------	--------	--------	--------	--------	--------	--------	2
Scrapes	--------	--------	--------	--------	642	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	642	--------	--------	--------
Dredges, oyster	--------	--------	--------	--------	230	32	--------	46
Yards at mouth	--------	--------	--------	--------	252	43	--------	33
Tongs	501	--------	627	607	310	437	355	118
Rakes	--------	--------	--------	--------	--------	--------	--------	20

CATCH: BY COUNTIES

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	858,609	$6,541	114,180	$735	193,150	$1,010	8,005	$116
Black bass	--------	--------	--------	--------	--------	--------	200	20
Bluefish	2,000	141	6,800	500	1,575	143	--------	--------
Butterfish	7,500	225	--------	--------	--------	--------	3,000	240
Carp	2,140	107	15,964	1,063	660	18	1,325	79
Catfish and bullheads	2,645	136	21,013	620	5,185	240	10,805	381
Croaker	192,411	2,282	1,073	35	102,000	1,253	3,100	124
Eels, common	16,813	761	10,300	557	260	15	1,153	19
Flounders	1,981	111	500	20	575	38	--------	--------
Gizzard shad	5,322	62	5,160	87	954	19	4,500	180
Harvestfish	35	1	--------	--------	--------	--------	--------	--------
Hickory shad	1,632	34	200	4	200	4	--------	--------
Pike or pickerel	--------	--------	375	73	207	31	173	31
Shad	90,532	8,301	2,270	228	68,082	7,234	11,384	1,365
Spot	8,367	201	--------	--------	100	2	225	9
Squeteagues or "sea trout", gray	308,216	11,648	3,000	180	5,000	220	4,000	320
Striped bass	4,666	480	8,188	1,081	7,291	1,093	9,850	1,442
Suckers	--------	--------	--------	--------	133	5	548	41
White perch	10,089	572	28,186	1,371	3,875	264	8,914	464
Yellow perch	375	25	12,954	702	740	52	670	44
Crabs:								
Hard	721,800	10,105	190,000	2,850	712,100	10,669	--------	--------
Soft	102,049	9,721	2,700	450	195,187	12,365	--------	--------
Oysters:								
Market, public, spring	470,470	26,884	57,750	2,475	125,513	11,972	--------	--------
Market, public, fall	717,507	46,220	26,250	1,500	301,119	29,387	--------	--------
Market, private, spring	--------	--------	--------	--------	70,000	6,900	--------	--------
Market, private, fall	--------	--------	--------	--------	87,500	8,750	--------	--------
Turtles, snapper	500	3	--------	--------	--------	--------	--------	--------
Total	3,525,659	124,561	506,863	14,531	1,881,406	91,684	67,852	4,875

Fisheries of Maryland, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Cecil		Charles		Dorchester		Harford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	757,600	$4,719	148,000	$821	462,212	$4,493	144,500	$1,325
Black bass	48,356	3,170	9,012	881			3,656	279
Bluefish			400	24	28,552	2,000		
Butterfish					200	20		
Carp	64,910	4,305	29,799	2,464	3,702	152	17,044	1,242
Catfish and bullheads	79,444	3,093	23,966	852	6,700	298	13,597	522
Crappie	1,000	24						
Croaker			5,000	100	268,125	3,893		
Eels, common	16,590	895	7,176	407	46,775	2,792	5,719	152
Flounders			87	5	12,969	506		
Gizzard shad			3,968	61				
Hickory shad	1,660	33	108	11	800	12	200	5
Pike or pickerel	12,965	1,631	814	125	50	8	5,685	866
Shad	115,778	11,789	124,962	10,101	103,182	10,882	56,810	5,864
Silver perch			562	12				
Spot			60	3	1,400	118		
Squeteagues or "sea trout":								
Gray	68	8	3,200	214	29,781	1,442		
Spotted					1,000	55		
Striped bass	36,139	4,284	39,909	4,727	29,356	3,394	16,408	2,100
Sturgeon			125	20				
Suckers	2,153	49	40	1			1,570	46
Sunfish	1,400	28					712	14
White perch	60,532	3,246	20,169	1,118	23,777	1,224	11,353	471
Yellow perch	89,600	3,888	3,864	256	20	1	10,024	614
Crabs:								
Hard			158,700	1,905	8,700,500	104,405		
Soft			2,775	239	545,251	32,732		
Oysters:								
Market, public, spring			65,044	5,575	398,639	24,221		
Market, public, fall			72,289	5,164	824,513	50,533		
Turtles, snapper	50	3						
Total	1,288,245	41,165	720,029	35,086	11,487,504	243,181	287,278	13,500

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	187,240	$1,420	995	$31	21,185	$133	618,572	$3,117
Black bass	22	1	15,220	1,372				
Bluefish	4,013	185					4,340	270
Butterfish	100	10					2,990	152
Carp	9,282	390	17,243	1,119	1,919	139	2,076	88
Catfish and bullheads	50,760	1,845	7,100	280	2,096	80	4,000	160
Crappie			379	28				
Croaker	54,620	933	4,500	180	65,600	682	70,670	1,286
Drum, red or redfish							200	10
Eels, common	9,601	671	315	20	4,518	371	600	30
Flounders	1,751	89					5,355	237
Gizzard shad	1,000	20					1,000	15
Hickory shad	150	6					1,020	21
Pike or pickerel	6,890	953	1,299	154	30	6		
Shad	148,560	16,047	9,490	920	1,330	141	138,754	12,327
Silver perch			500	10				
Spot	1,450	34			3,000	60	925	40
Squeteagues or "sea trout":								
Gray	52,544	2,212	10	1	146	12	50,120	2,058
Spotted					450	25		
Striped bass	71,695	9,053	1,895	203	3,253	363	31,150	3,479
Suckers	800	36	2,215	94				
White perch	67,402	4,087	1,500	112	7,775	334	3,565	176
Whiting							500	25
Yellow perch	27,339	1,612	4,560	307	13,649	889		
Crabs:								
Hard	1,377,500	17,218			2,855,900	35,699	498,700	6,842
Soft	186,920	21,360			253,436	22,696	96,519	8,752
Oysters:								
Market, public, spring	366,626	20,670			592,085	27,327	199,252	9,381
Market, public, fall	770,034	44,097			1,336,375	68,778	441,916	23,948
Market, private, spring							47,915	4,791
Market, private, fall							46,276	4,360
Total	3,396,302	142,949	67,221	4,831	5,162,747	157,735	2,266,415	81,565

Fisheries of Maryland, 1933—Continued

CATCH: By counties—Continued

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	423,900	$3,010	2,509,925	$14,307	69,100	$886	32,500	$500
Black bass	--------	--------	--------	--------	25	2	--------	--------
Bluefish	2,750	212	41,670	3,301	7,100	445	19,500	885
Bonito	--------	--------	--------	--------	--------	--------	9,100	194
Butterfish	10,273	652	500	30	2,200	130	562,500	11,250
Cabio or crab eater	--------	--------	--------	--------	--------	--------	1,100	44
Carp	1,761	53	505	37	1,500	150	--------	--------
Catfish and bullheads	5,060	252	11,897	462	17,800	1,000	1,000	40
Cod	--------	--------	--------	--------	--------	--------	100	2
Croaker	146,107	3,125	101,160	1,901	32,300	845	760,200	7,710
Dolphin	--------	--------	--------	--------	--------	--------	500	75
Drum:								
Black	--------	--------	--------	--------	12,000	200	30,000	150
Red or redfish	3,500	60	--------	--------	--------	--------	3,500	70
Eels:								
Common	380	22	59,360	3,502	2,600	130	21,000	1,380
Others	--------	--------	--------	--------	--------	--------	250	3
Flounders	18,001	574	2,845	155	7,000	534	18,500	925
Gizzard shad	2,100	63	500	22	3,000	55	--------	--------
Harvestfish	3,000	180	--------	--------	8,000	480	8,500	170
Hickory shad	1,406	36	3,050	63	--------	--------	1,000	20
King whiting or "kingfish"	--------	--------	--------	--------	--------	--------	9,900	396
Mackerel	--------	--------	--------	--------	--------	--------	27,200	272
Mullet	100	6	--------	--------	--------	--------	20,000	1,200
Pike or pickerel	--------	--------	--------	--------	200	35	--------	--------
Scup	--------	--------	--------	--------	--------	--------	82,500	1,650
Sea bass	--------	--------	--------	--------	--------	--------	10,100	505
Sea robin	--------	--------	--------	--------	--------	--------	500	25
Shad	155,048	16,266	270,131	24,310	60,103	5,738	17,899	1,629
Spanish mackerel	--------	--------	--------	--------	--------	--------	1,400	70
Spot	500	10	1,600	42	1,500	70	11,500	115
Squeteagues or "sea trout":								
Gray	62,874	2,879	5,795	261	44,000	1,765	584,900	8,823
Spotted	6,313	367	500	50	--------	--------	--------	--------
Striped bass	7,012	985	22,886	2,165	23,497	2,812	600	78
Sturgeon	--------	--------	--------	--------	160	15	400	80
Suckers	--------	--------	100	5	--------	--------	--------	--------
Tautog	--------	--------	--------	--------	--------	--------	5,000	150
White perch	9,600	522	13,583	587	13,350	1,034	2,200	220
Yellow perch	--------	--------	4,000	200	150	13	--------	--------
Crabs:								
Hard	4,417,100	55,213	6,534,000	81,674	31,800	573	450,000	4,594
Soft	1,852,915	111,180	209,152	18,700	--------	--------	2,125	206
Clams, hard, public	--------	--------	--------	--------	--------	--------	41,536	3,894
Oysters:								
Market, public, spring	558,208	34,552	447,129	26,653	47,460	2,768	--------	--------
Market, public, fall	1,752,769	139,732	867,192	58,489	169,236	9,877	--------	--------
Market, private, spring	19,020	1,464	--------	--------	71,190	4,153	182,000	26,675
Market, private, fall	105,917	18,417	--------	--------	253,854	14,809	193,736	27,675
Squid	--------	--------	--------	--------	--------	--------	37,500	750
Terrapin, diamond-back	1,800	500	--------	--------	--------	--------	--------	--------
Total	9,567,417	390,332	11,107,480	236,916	879,125	48,519	3,150,246	102,425

VIRGINIA

Fisheries of Virginia, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets		Lines, trot with baits or snoods	Pound nets	Stop nets	Fyke nets	Dip nets	Otter trawls
			Drift	Stake						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	1,103									106
On boats and shore:										
Regular		251	76	95	946	1,792	9	79	496	
Casual		260	533	189	135	258	3	73	1,187	
Total	1,103	511	609	284	1,081	2,050	12	152	1,683	106
Vessels:										
Steam	25									
Net tonnage	2,831									
Motor	9									27
Net tonnage	698									389
Total vessels	34									27
Total tonnage	3,529									389
Boats:										
Motor		163	69	115	946	557	6	63	174	
Other		97	336	76	131	630	5	58	1,273	
Accessory boats	102									
Apparatus:										
Number	34	191	410	4,913	1,075	1,880	6	649	1,675	27
Length, yards	10,160	52,063								
Square yards			337,045	266,575			10,300			
Yards at mouth										803
Hooks, baits, or snoods					499,610					

Item	Pots, eel	Scrapes	Dredges			Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels			163	109	4	12				1,471
On boats and shore:										
Regular	6	41	36	208		3,826	342	540	329	7,073
Casual			3			592	20		25	3,071
Total	6	41	202	317	4	4,430	362	540	354	11,615
Vessels:										
Steam										25
Net tonnage										2,831
Motor			52	20	1	4				105
Net tonnage			420	302	18	22				1,761
Sail				3						3
Net tonnage				22						22
Total vessels			52	23	1	4				133
Total tonnage			420	324	18	22				4,614
Boats:										
Motor	2	20	13	125		2,338	92	42	18	4,212
Other	2	21				538	293	440	156	3,621
Accessory boats										102
Apparatus:										
Number	35	41	130	298	2	3,748	362	540		
Yards at mouth		41	235	339	6					

Fisheries of Virginia, 1933—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			59,400	$573	15,205	$256	12,800	$182
Bluefish			59,040	2,358	2,100	105		
Butterfish			1,000	25				
Carp			310,554	12,772	440	9		
Catfish and bullheads			240,510	7,531				
Croaker			712,130	9,663	13,089	124	2,000	40
Drum, red or redfish			13,052	366				
Eels			52,400	1,572				
Flounders			23,730	953				
Gizzard shad			26,240	517	1,740	30	7,340	147
Hickory shad			1,389	37	4,443	135		
Menhaden	115,343,100	$384,227						
Mullet			1,901	79	3,660	98	31,180	1,145
Pigfish			50,740	282				
Pike or pickerel			25	2				
Shad			4,564	451	530,493	39,699	372,755	28,367
Spot			296,120	6,696	33,970	1,017	1,160	35
Squeteagues or "sea trout":								
Gray			173,815	5,462	3,400	170	4,090	178
Spotted			150,720	12,251	3,360	190		
Striped bass			80,880	9,297	41,731	4,341	63,010	7,977
White perch			81,440	3,239	2,750	132		
Yellow perch			20,035	1,000	575	28		
Total	115,343,100	384,227	2,359,685	75,126	656,956	46,334	494,335	38,071

Species	Lines, trot with baits or snoods		Pound nets		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			19,071,306	$85,561			18,520	$192
Bluefish			595,160	22,361				
Bonito			10,092	455				
Butterfish			2,220,455	53,148			4,650	134
Cabio or crab eater			18,842	791				
Carp			46,010	1,606	52,263	$1,856	19,197	634
Catfish and bullheads			202,855	6,156	11,241	452	263,802	8,212
Cod			6,525	130				
Croaker			10,881,977	131,247			18,880	328
Drum:								
Black			80,480	1,594				
Red or redfish			34,069	1,018				
Eels			41,180	2,161			8,328	434
Flounders			281,890	19,746			4,000	60
Gizzard shad			60,180	1,322			21,320	383
Harvestfish			160,050	3,585				
Hickory shad			49,255	1,007			1,141	17
King whiting or "kingfish"			29,211	841				
Mackerel			16,056	893				
Menhaden			647,400	1,598				
Mullet			5,595	231			2,205	95
Pigfish			6,430	129				
Pike or pickerel							175	9
Pompano			4,530	248				
Scup			337,540	13,005				
Sea bass			4,980	199				
Shad			3,902,955	370,916			5,947	594
Spanish mackerel			66,501	3,950				
Spot			358,595	9,764				
Squeteagues or "sea trout":								
Gray			11,754,530	211,616			10,760	399
Spotted			9,740	525				
Striped bass			303,151	38,758			30,128	3,101
Sturgeon			4,946	1,112				
Tautog			560	12				
Thimble-eyed mackerel			11,250	169				
White perch			82,069	3,320			81,059	3,134
Yellow perch			5,150	258			46,005	2,313
Crabs, hard	17,047,155	$169,599						
Squid			94,440	2,339				
Turtles, snapper							1,500	60
Total	17,047,155	169,599	51,405,955	991,771	63,504	2,308	537,617	20,099

Fisheries of Virginia, 1933—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Otter trawls		Pots, eel		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			217	$2				
Bluefish			28, 059	2, 205				
Butterfish			59, 248	1, 896				
Cod			341	7				
Croaker			2, 607, 106	45, 318				
Drum, red or redfish			4, 418	72				
Eels			4, 050	66	2, 676	$114		
Flounders			773, 793	31, 272				
Haddock			47	1				
Hake			23, 455	387				
King whiting or "kingfish"			35, 092	1, 209				
Mackerel			160	8				
Pigfish			3, 595	109				
Pollock			25	1				
Scup			1, 168, 591	23, 319				
Sea bass			327, 095	9, 193				
Sharks			10, 225	159				
Spot			26, 820	498				
Squeteagues or "sea trout":								
Gray			363, 543	13, 156				
Spotted			595	31				
Sturgeon			3, 195	484				
Swellfish			1, 065	53				
Tautog			488	9				
White perch			102	3				
Crabs:								
Hard	193, 100	$1, 968					116, 550	$1, 058
Soft	1, 939, 257	135, 629					128, 700	7, 722
Lobsters			131	2				
Shrimp			371	20				
Scallops, sea			195	44				
Squid			13, 353	288				
Total	2, 132, 357	137, 597	5, 455, 375	129, 812	2, 676	114	245, 250	8, 780

Species	Dredges						Tongs	
	Crab		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	6, 554, 570	$111, 273						
Clams, hard, public							718, 522	$152, 074
Oysters:								
Market, public, spring			12, 102	$672			1, 645, 547	94, 280
Market, public, fall			600	35			2, 624, 965	147, 599
Market, private, spring			1, 846, 178	142, 986			1, 608, 059	117, 311
Market, private, fall			3, 184, 544	239, 613			1, 954, 013	142, 930
Scallops, sea					72, 450	$8, 050		
Total	6, 554, 570	111, 273	5, 043, 424	383, 036	72, 450	8, 050	8, 551, 106	654, 194

Species	Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public	91, 160	$22, 790	279, 864	$69, 464	79, 720	$19, 930
Oysters:						
Market, public, spring	1, 200	100			1, 200	90
Market, public, fall	5, 000	435			1, 440	120
Market, private, spring	302, 464	26, 143				
Market, private, fall	280, 460	24, 741				
Terrapin, diamond-back					10, 240	2, 500
Total	680, 284	74, 209	279, 864	69, 464	92, 600	22, 640

Fisheries of Virginia, 1933—Continued

OPERATING UNITS: BY COUNTIES

Item	Accomac	Arlington	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	19	--------	--------	--------	--------	--------	124	--------	--------
On boats and shore:									
Regular	1,432	4	--------	10	--------	--------	153	108	34
Casual	89	18	6	98	23	9	--------	24	41
Total	1,540	22	6	108	23	9	277	132	75
Vessels:									
Motor	2	--------	--------	--------	--------	--------	31	--------	--------
Net tonnage	11	--------	--------	--------	--------	--------	418	--------	--------
Sail	3	--------	--------	--------	--------	--------	--------	--------	--------
Net tonnage	22	--------	--------	--------	--------	--------	--------	--------	--------
Total vessels	5	--------	--------	--------	--------	--------	31	--------	--------
Total net tonnage	33	--------	--------	--------	--------	--------	418	--------	--------
Boats:									
Motor	727	10	--------	5	--------	--------	81	42	34
Other	727	2	3	68	14	5	7	49	15
Apparatus:									
Haul seines	13	--------	1	2	2	1	--------	3	4
Length, yards	8,640	--------	300	325	400	200	--------	1,000	840
Gill nets:									
Drift	--------	11	2	64	12	4	--------	7	30
Square yards	--------	22,415	1,800	39,040	3,960	2,080	--------	5,600	45,800
Stake	4	--------	--------	110	--------	--------	--------	--------	--------
Square yards	1,440	--------	--------	3,340	--------	--------	--------	--------	--------
Lines, trot with baits or snoods	168	--------	--------	--------	--------	--------	9	3	--------
Baits or snoods	86,600	--------	--------	--------	--------	--------	3,500	1,200	--------
Pound nets	214	--------	--------	--------	--------	--------	137	2	--------
Stop nets	--------	--------	--------	2	--------	--------	--------	--------	--------
Square yards	--------	--------	--------	1,600	--------	--------	--------	--------	--------
Fyke nets	3	2	--------	19	3	--------	--------	--------	196
Dip nets	364	--------	--------	--------	--------	--------	--------	--------	--------
Otter trawls	--------	--------	--------	--------	--------	--------	11	--------	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	330	--------	--------
Pots, eel	--------	--------	--------	14	--------	--------	--------	--------	--------
Scrapes	41	--------	--------	--------	--------	--------	--------	--------	--------
Yards at mouth	41	--------	--------	--------	--------	--------	--------	--------	--------
Dredges:									
Crab	2	--------	--------	--------	--------	--------	32	--------	--------
Yards at mouth	3	--------	--------	--------	--------	--------	64	--------	--------
Oyster	256	--------	--------	--------	--------	--------	14	--------	--------
Yards at mouth	269	--------	--------	--------	--------	--------	25	--------	--------
Scallop	--------	--------	--------	--------	--------	--------	2	--------	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	6	--------	--------
Tongs	694	--------	--------	--------	--------	--------	43	99	--------
Rakes	174	--------	--------	--------	--------	--------	--------	--------	--------
Picks	315	--------	--------	--------	--------	--------	--------	--------	--------

Item	Gloucester	Henrico	Isle of Wight	James City	King and Queen	King George	King William	Lancaster	Mathews
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	6	--------	3	--------	--------	--------	--------	443	16
On boats and shore:									
Regular	338	3	519	37	--------	72	--------	536	642
Casual	39	65	59	31	51	74	83	417	211
Total	383	68	581	68	51	146	83	1,396	869
Vessels:									
Steam	--------	--------	--------	--------	--------	--------	--------	8	--------
Net tonnage	--------	--------	--------	--------	--------	--------	--------	820	--------
Motor	2	--------	1	--------	--------	--------	--------	9	4
Net tonnage	15	--------	5	--------	--------	--------	--------	385	36
Total vessels	2	--------	1	--------	--------	--------	--------	17	4
Total net tonnage	15	--------	5	--------	--------	--------	--------	1,205	36

Fisheries of Virginia, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Gloucester	Henrico	Isle of Wright	James City	King and Queen	King George	King William	Lancaster	Mathews
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	218	--------	226	29	--------	61	5	374	356
Other	72	40	73	27	33	39	49	293	306
Accessory boats	--------	--------	--------	--------	--------	--------	--------	42	--------
Apparatus:									
Purse seines, menhaden	--------	--------	--------	--------	--------	--------	--------	14	--------
Length, yards	--------	--------	--------	--------	--------	--------	--------	4, 240	--------
Haul seines	--------	3	1	2	1	5	2	1	5
Length, yards	--------	375	200	540	200	1, 380	173	800	1, 980
Gill nets:									
Drift	4	37	--------	13	31	17	49	--------	6
Square yards	3, 200	19, 240	--------	7, 300	19, 600	21, 870	29, 890	--------	3, 100
Stake	--------	--------	1, 720	1, 024	--------	690	--------	--------	--------
Square yards	--------	--------	58, 480	30, 820	--------	70, 000	--------	--------	--------
Lines, trot, with baits or snoods	52	--------	61	--------	--------	16	--------	47	88
Baits or snoods	26, 400	--------	33, 400	--------	--------	8, 500	--------	25, 300	46, 400
Pound nets	107	--------	7	7	--------	36	--------	182	459
Fyke nets	13	--------	96	43	2	30	6	--------	--------
Dip nets	--------	--------	--------	--------	--------	--------	--------	290	86
Dredges:									
Crab	4	--------	--------	--------	--------	--------	--------	--------	6
Yards at mouth	8	--------	--------	--------	--------	--------	--------	--------	12
Oyster	--------	--------	--------	--------	--------	--------	--------	6	8
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	9	12
Tongs	186	--------	468	7	--------	12	--------	426	172

Item	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland	Prince George	Princess Anne
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4	3	--------	33	--------	670	--------	--------
On boats and shore:								
Regular	619	141	6	73	503	822	7	72
Casual	286	7	67	58	63	744	24	147
Total	909	151	73	164	566	2, 236	31	219
Vessels:								
Steam	--------	--------	--------	--------	--------	17	--------	--------
Net tonnage	--------	--------	--------	--------	--------	2, 011	--------	--------
Motor	1	1	--------	6	--------	3	--------	--------
Net tonnage	8	6	--------	112	--------	352	--------	--------
Total vessels	1	1	--------	6	--------	20	--------	--------
Total net tonnage	8	6	--------	112	--------	2, 363	--------	--------
Boats:								
Motor	475	56	2	47	209	469	4	81
Other	164	--------	57	71	404	823	17	69
Accessory boats	--------	--------	--------	--------	--------	60	--------	--------
Apparatus:								
Purse seines, menhaden	--------	--------	--------	--------	--------	20	--------	--------
Length, yards	--------	--------	--------	--------	--------	5, 920	--------	--------
Haul seines	7	--------	3	5	7	--------	4	81
Length, yards	2, 180	--------	800	2, 460	2, 080	--------	520	16, 820
Gill nets:								
Drift	--------	--------	56	16	--------	3	13	--------
Square yards	--------	--------	44, 800	3, 200	--------	2, 940	9, 860	--------
Stake	--------	189	--------	210	4	--------	--------	--------
Square yards	--------	5, 670	--------	6, 300	2, 080	--------	--------	--------
Lines, trot, with baits or snoods	49	--------	--------	50	113	204	--------	32
Baits or snoods	32, 600	--------	--------	25, 500	5, 600	105, 760	--------	9, 600
Pound nets	14	--------	--------	28	120	411	--------	6
Stop nets	--------	--------	--------	--------	--------	--------	4	--------
Square yards	--------	--------	--------	--------	--------	--------	8, 700	--------
Fyke nets	--------	2	15	--------	3	4	79	--------
Dip nets	148	--------	--------	--------	46	741	--------	--------
Otter trawls	--------	--------	--------	2	--------	--------	--------	--------
Yards at mouth	--------	--------	--------	60	--------	--------	--------	--------
Pots, eel	--------	--------	21	--------	--------	--------	--------	--------
Dredges:								
Oyster	2	--------	--------	10	--------	--------	--------	--------
Yards at mouth	3	--------	--------	17	--------	--------	--------	--------
Tongs	539	104	--------	56	190	135	--------	34
Rakes	--------	--------	--------	--------	188	--------	--------	--------
Picks	--------	--------	--------	--------	225	--------	--------	--------

Fisheries of Virginia, 1933—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Prince William	Richmond	Spotsylvania	Stafford	Surry	Warwick	Westmoreland	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	--------	--------	--------	--------	--------	16	--------	134
On boats and shore:								
Regular	24	121	--------	62	14	226	257	238
Casual	40	67	2	34	29	43	118	4
Total	64	188	2	96	43	285	375	376
Vessels:								
Motor	--------	--------	--------	--------	--------	4	--------	41
Net tonnage	--------	--------	--------	--------	--------	53	--------	360
Boats:								
Motor	35	48	--------	43	14	149	249	163
Other	5	74	1	16	14	6	60	18
Apparatus:								
Haul seines	5	--------	1	12	3	--------	3	14
Length, yards	380	--------	300	1, 180	780	--------	410	6, 800
Gill nets:								
Drift	13	16	1	2	--------	--------	1	2
Square yards	23, 490	17, 400	500	7, 000	--------	--------	1, 100	1, 860
Stake	44	--------	--------	112	672	112	10	12
Square yards	20, 145	--------	--------	42, 900	20, 160	4, 480	400	360
Lines, trot, with baits or snoods	2	9	--------	7	--------	--------	119	46
Baits or snoods	1, 000	3, 850	--------	3, 500	--------	--------	58, 400	22, 500
Pound nets	--------	24	--------	14	--------	10	73	29
Fyke nets	64	1	--------	35	21	3	3	6
Otter trawls	--------	--------	--------	--------	--------	4	--------	10
Yards at mouth	--------	--------	--------	--------	--------	117	--------	296
Dredges:								
Crab	--------	--------	--------	--------	--------	--------	--------	86
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	148
Oyster	--------	--------	--------	--------	--------	--------	--------	2
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	4
Tongs	--------	95	--------	--------	--------	219	148	121

CATCH: BY COUNTIES

Species	Accomac		Arlington		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	770, 060	$3, 850	--------	--------	1, 000	$18	21, 700	$217
Bluefish	64, 350	3, 088	--------	--------	--------	--------	--------	--------
Bonito	6, 252	301	--------	--------	--------	--------	--------	--------
Butterfish	581, 560	14, 559	--------	--------	--------	--------	--------	--------
Carp	--------	--------	--------	--------	1, 500	42	23, 677	725
Catfish and bullheads	780	31	830	$33	900	27	32, 197	1, 452
Cod	1, 800	36	--------	--------	--------	--------	--------	--------
Croaker	1, 323, 147	20, 252	--------	--------	--------	--------	--------	--------
Drum:								
Black	80, 480	1, 594	--------	--------	--------	--------	--------	--------
Red or redfish	25, 559	574	--------	--------	--------	--------	--------	--------
Eels	32, 040	1, 615	--------	--------	--------	--------	2, 196	85
Flounders	54, 400	2, 176	--------	--------	--------	--------	--------	--------
Gizzard shad	--------	--------	--------	--------	800	20	3, 500	35
Harvestfish	8, 060	98	--------	--------	--------	--------	--------	--------
Hickory shad	--------	--------	--------	--------	200	8	--------	--------
King whiting or "kingfish"	1, 875	75	--------	--------	--------	--------	--------	--------
Mackerel	5, 826	381	--------	--------	--------	--------	--------	--------
Mullet	4, 640	232	--------	--------	500	15	--------	--------
Scup	105, 620	3, 774	--------	--------	--------	--------	--------	--------
Shad	185, 827	17, 115	69, 188	3, 731	900	135	66, 657	6, 820
Spanish mackerel	4. 545	266	--------	--------	--------	--------	--------	--------
Spot	32, 295	896	--------	--------	--------	--------	--------	--------
Squeteagues or "sea trout":								
Gray	1, 517, 950	37, 292	--------	--------	--------	--------	--------	--------
Spotted	2, 640	137	--------	--------	--------	--------	--------	--------
Striped bass	8, 540	864	--------	--------	200	20	2, 688	338
Sturgeon	2, 600	521	--------	--------	--------	--------	--------	--------
Thimble-eyed mackerel	11, 250	169	--------	--------	--------	--------	--------	--------
White perch	560	16	225	10	1, 000	50	1, 454	64
Yellow perch	--------	--------	245	12	700	35	75	7
Crabs:								
Hard	2, 648, 590	27, 232	--------	--------	--------	--------	--------	--------
Soft	932, 429	49, 254	--------	--------	--------	--------	--------	--------
Clams, hard, public	606, 518	126, 852	--------	--------	--------	--------	--------	--------
Oysters:								
Market, public, spring	122, 174	7, 749	--------	--------	--------	--------	--------	--------
Market, public, fall	197, 444	13, 721	--------	--------	--------	--------	--------	--------
Market, private, spring	952, 140	92, 016	--------	--------	--------	--------	--------	--------
Market, private, fall	1, 095, 240	103, 617	--------	--------	--------	--------	--------	--------
Squid	55, 500	1, 560	--------	--------	--------	--------	--------	--------
Terrapin, diamond-back	10. 210	2, 500	--------	--------	--------	--------	--------	--------
Total	11, 452, 931	534, 413	70, 488	3, 786	7, 700	370	154, 144	9, 743

Fisheries of Virginia, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5, 370	$65	4, 650	$46	118, 047	$621	4, 800	$76
Bluefish					65, 369	3, 268		
Butterfish					126, 160	3, 476		
Carp	3, 600	99	2, 800	112			7, 000	340
Catfish and bullheads	680	22					11, 500	450
Cod					138	3		
Croaker					2, 966, 978	45, 474	7, 500	155
Drum, red or redfish					4, 188	67		
Eels					3, 768	62		
Flounders					457, 554	18, 603		
Gizzard shad					1, 200	18	14, 500	310
Haddock					47	1		
Hake					20, 524	326		
Harvestfish					8, 460	212		
Hickory shad	615	15	250	5	14, 100	282	1, 050	29
King whiting or "kingfish"					21, 602	736		
Mackerel					150	7		
Mullet	35	2			3, 000	116	800	36
Pigfish					2, 813	95		
Pollock					25	1		
Scup					605, 291	12, 112		
Sea bass					239, 992	7, 017		
Shad	3, 115	321	480	48	191, 900	19, 190	5, 800	545
Sharks					8, 866	119		
Spanish mackerel					1, 350	54		
Spot					80, 999	2, 257		
Squeteagues or "sea trout":								
Gray					643, 911	13, 282		
Spotted					595	31		
Striped bass	310	20	1, 240	136	41, 500	4, 150	4, 700	530
Sturgeon					2, 879	450		
Swellfish					491	25		
Tautog					891	19		
White perch					102	3	1, 600	80
Yellow perch							800	40
Crabs, hard					2, 533, 750	44, 196	32, 760	312
Lobsters					131	2		
Shrimp					172	9		
Clams, hard, public					63, 120	15, 780		
Oysters:								
Market, public, spring					19, 200	1, 280	115, 577	5, 779
Market, public, fall					43, 200	2, 880	144, 227	7, 211
Market, private, spring					336, 519	24, 037	74, 718	4, 260
Market, private, fall					1, 050, 090	74, 974	53, 207	3, 040
Scallops, sea					72, 645	8, 094		
Squid					12, 534	267		
Total	13, 725	544	9, 420	347	9, 764, 251	303, 596	480, 539	23, 193

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			18, 200	$114	1, 355	$11	10, 300	$206
Bluefish			105, 735	4, 229				
Butterfish			295, 980	5, 919			5, 150	154
Cabio or crab eater			820	49				
Carp	7, 620	$229			34, 730	1, 106	12, 580	377
Catfish and bullheads	106, 290	3, 178	1, 040	21	5, 235	178	19, 600	588
Croaker			1, 633, 960	24, 514			60, 500	1, 210
Eels			370	18			2, 000	50
Flounders			16, 540	661				
Gizzard shad	480	10					26, 460	530
Harvestfish			62, 400	1, 248				
Hickory shad			958	19				
King whiting or "kingfish"			19, 561	391				
Menhaden			70, 000	226				
Mullet							9, 000	450
Shad	205, 366	12, 516	172, 940	17, 294	9, 508	1, 152	52, 720	6, 527
Spanish mackerel			1, 496	150				
Spot			36, 680	1, 100				
Squeteagues or "sea trout":								
Gray			1, 472, 240	18, 404			8, 500	425
Spotted			940	51				
Striped bass	26, 830	1, 945	427	47	615	73	9, 270	943
White perch	32, 830	1, 249	260	10	100	5	12, 300	461
Yellow perch	23, 190	1, 159	540	27	75	3		
Crabs, hard			1, 855, 500	19, 110			160, 800	1, 340
Clams, hard, public			166, 400	39, 200			9, 600	2, 400
Oysters:								
Market, public, spring			104, 340	7, 350			235, 440	15, 706
Market, public, fall			177, 400	12, 560			255, 120	17, 008
Market, private, spring							34, 800	2, 900
Market, private, fall							49, 200	4, 100
Total	402, 606	20, 286	6, 214, 727	152, 712	51, 618	2, 528	973, 340	55, 375

Fisheries of Virginia, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	James City		King and Queen		King George		King William	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,400	$74	1,440	$28	142,000	$770	17,540	$137
Bluefish	150	8						
Butterfish					2,500	55		
Carp	20,740	709			12,440	429	20	1
Catfish and bullheads	20,330	519	840	25	185,550	4,766	456	23
Croaker	11,880	185			1,700	37		
Gizzard shad	23,880	478			4,400	93		
Hickory shad			480	15	2,500	83	620	6
Mullet			1,560	42	1,550	72	236	6
Pike or pickerel							25	2
Shad	32,860	3,286	10,148	1,066	125,454	9,872	15,936	1,342
Squeteagues or "sea trout", gray	1,000	30			9,520	286		
Striped bass	21,570	2,167	530	56	106,180	15,811	89	9
White perch	14,610	595	340	16	56,475	2,306	130	4
Yellow perch	950	38			3,890	213	100	4
Crabs, hard					192,000	3,200		
Clams, hard, public	1,000	175						
Oysters:								
Market, public, spring					8,680	620		
Market, private, spring					10,610	760		
Market, private, fall					14,400	1,050		
Total	156,400	8,264	15,338	1,248	879,879	40,423	35,152	1,534

Species	Lancaster		Mathews		Middlesex		Nansemond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,711,400	$8,561	488,500	$2,441	30,000	$170		
Bluefish	89,020	4,126	205,710	6,306	7,860	460		
Butterfish			472,319	11,812				
Cabio or crab eater			15,910	636				
Carp					37,840	915		
Catfish and bullheads					2,000	60		
Croaker	502,720	5,327	3,492,100	34,921	136,635	1,472	2,640	$48
Flounders	27,580	1,134	53,900	10,528	500	20		
Gizzard shad	480	24					780	9
Harvestfish			10,830	270				
Menhaden	44,840,200	149,071	92,000	220				
Pigfish			6,430	129				
Shad	409,430	40,943	1,035,293	93,175	8,970	897	3,420	342
Spanish mackerel			13,460	673				
Spot	31,920	791	172,610	4,284	41,540	1,009		
Squeteagues or "sea trout":								
Gray	569,970	11,399	3,177,660	39,788	42,100	1,047		
Spotted	10,800	5,024	30,800	1,562				
Striped bass	12,940	5,675	26,230	2,555	13,390	1,339		
Sturgeon			918	367				
White perch			4,590	138	1,160	58	980	39
Crabs:								
Hard	633,000	3,165	1,223,520	11,802	764,520	6,370		
Soft	174,600	23,200	35,520	1,954	356,200	28,496		
Clams, hard, public			23,120	5,460			70,400	17,600
Oysters:								
Market, public, spring	413,241	20,662	22,303	1,312	188,657	9,433	120,000	7,960
Market, public, fall	716,285	33,814	48,036	3,049	448,910	22,415	177,300	11,745
Market, private, spring	305,256	17,003	182,541	13,602	121,664	7,580	144,000	12,000
Market, private, fall	489,867	28,942	193,686	14,615	188,963	13,448	162,000	13,500
Total	50,938,709	358,864	11,027,986	261,599	2,390,909	95,219	681,520	63,243

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5,000	$50	133,000	$665	43,200	$218	12,675,246	$57,682
Bluefish			7,992	406	27,250	1,200	63,025	2,206
Bonito					3,840	154		
Butterfish			206,871	4,185	410,200	10,254	22,796	671
Cabio or crab eater							2,112	106
Carp	4,350	174						
Catfish and bullheads	13,750	354						
Cod			115	2	4,725	94		
Croaker			349,022	3,569	747,520	12,837	1,604,955	16,041
Drum, red or redfish			1,340	53	7,392	278	2,610	106
Eels	580	35	282	4	10,130	655	1,800	128
Flounders			91,370	3,472	51,470	2,059	29,290	1,071

Fisheries of Virginia, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Gizzard shad	7,040	$145						
Hake			1,484	$28				
Harvestfish			62,500	1,562				
Hickory shad							19,425	$399
King whiting or "kingfish"			4,814	260	3,845	$154	350	11
Mackerel					6,810	341		
Menhaden							70,988,300	236,308
Mullet	250	5	9,750	196	6,680	267		
Pigfish			1,140	34				
Pike or pickerel	175	9						
Pompano			2,240	134			2,290	114
Scup			65,470	1,331	224,660	9,086		
Sea bass			28,741	540	4,980	199		
Shad	28,582	3,042	71,160	7,203	27,760	2,776	1,510,240	145,999
Sharks			763	23				
Spanish mackerel			24,890	1,990	13,040	573		
Spot			87,080	2,319	29,450	884	26,360	591
Squeteagues or "sea trout":								
Gray			113,321	2,426	3,621,010	80,440	371,460	8,961
Spotted			7,900	395	16,000	1,060	1,200	60
Striped bass	3,000	300	3,670	367	900	108	66,730	6,673
Sturgeon			1,453	228				
Swellfish			259	13				
White perch	2,740	118			4,914	147		
Yellow perch	1,400	70						
Crabs:								
Hard			1,452,000	11,650	816,000	10,375	3,681,355	29,247
Soft					150,000	12,500	419,208	27,947
Shrimp			125	7				
Clams, hard, public			16,000	4,000	139,636	34,422		
Oysters:								
Market, public, spring					1,200	100	3,900	200
Market, public, fall					10,476	873	39,700	2,430
Market, private, spring			689,164	49,226	262,892	20,241	139,790	9,668
Market, private, fall			1,103,907	78,850	142,240	11,854	240,800	16,280
Squid			257	6	38,940	779		
Turtles, snapper	1,500	60						
Total	68,367	4,362	4,538,080	175,144	6,827,160	214,928	91,912,972	562,899

Species	Prince George		Princess Anne		Prince William		Richmond		Spotsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6,050	$80	21,000	$105	15,470	$232	46,750	$907		
Bluefish			7,100	355						
Butterfish			135,380	3,385			1,400	43		
Carp	38,417	1,569	125,600	6,280	20,800	1,042	15,550	498	500	$15
Catfish and bullheads	50,795	1,759	2,800	84	43,300	1,299	68,100	2,889	1,000	40
Croaker			159,000	1,590			20,500	485		
Drum, red or redfish			9,930	365						
Eels	1,548	72	52,400	1,572			700	35		
Flounders			3,400	160						
Gizzard shad							23,500	585	1,000	30
Harvestfish			7,800	195						
Hickory shad	300	8					300	15	100	5
Mackerel			3,420	171						
Mullet	275	15					75	3		
Shad	8,530	880	17,800	1,798	126,426	8,393	23,050	3,035	300	15
Spanish mackerel			7,300	219						
Spot			34,900	896						
Squeteagues or "sea trout":										
Gray			258,600	3,233			4,600	276		
Spotted			24,600	1,230						
Striped bass	860	87			23,400	2,340	8,500	1,250	100	15
White perch	900	35	8,300	415	17,340	566	15,850	793	500	25
Yellow perch	400	16			13,800	690	2,050	103	500	25
Crabs, hard			813,100	7,400	13,200	124	51,480	936		
Clams, hard, public			2,632	659						
Oysters:										
Market, public, spring							115,577	5,779		
Market, public, fall							144,227	7,211		
Market, private, spring			10,360	2,220			74,725	4,261		
Market, private, fall			14,140	3,030			53,207	3,040		
Total	108,075	4,521	1,719,562	35,362	273,736	14,686	670,141	32,144	4,000	170

Fisheries of Virginia, 1933—Continued

CATCH: BY COUNTIES—Continued

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			7,000	$58	8,070	$73	2,846,200	$9,204	16,700	$84
Bluefish					731	58			40,067	1,319
Butterfish					13,340	360			11,697	330
Carp	28,160	$1,126	21,900	657			8,640	432		
Catfish and bullheads	94,990	2,850	19,520	585			29,925	998	6,000	120
Cod					36	1			52	1
Croaker			4,010	60	455,524	7,734	102,870	1,286	652,021	9,523
Drum, red or redfish					200	4			290	9
Eels			820	16						
Flounders					81,237	3,184			216,172	8,963
Gizzard shad			8,800	112						
Hake					245	5			1,202	28
Hickory shad							15,330	307		
King whiting or "kingfish"					5,127	141			7,129	282
Mackerel					10	1				
Mullet					900	32			5,290	159
Pigfish					687	12			49,695	250
Scup					265,433	5,271			239,657	4,750
Sea bass					17,015	452			41,347	1,184
Shad	163,644	10,705	7,710	771	5,170	517	178,080	14,334	42,350	4,242
Sharks					396	11			200	6
Spanish mackerel									420	25
Spot					9,229	202			133,602	2,781
Squeteagues or "sea trout":										
Gray					108,226	3,141	211,920	5,298	178,150	5,253
Spotted									68,940	3,447
Striped bass	20,060	2,342	7,810	781	8,420	842	93,563	11,227	4,638	464
Sturgeon					263	27			28	3
Swellfish									315	15
Tautog					157	2				
White perch	35,855	1,434	6,980	216	3,800	115	21,495	860		
Yellow perch	22,450	1,127							600	30
Crabs, hard	92,400	840					1,038,400	13,464	5,909,000	93,135
Shrimp									74	4
Clams, hard, public									70,840	17,710
Oysters:										
Market, public, spring					69,780	4,652	24,700	1,270	95,280	5,290
Market, public, fall					110,520	7,368	7,800	400	111,360	5,474
Market, private, spring					16,752	838	149,940	8,568	250,800	17,260
Market, private, fall					7,200	360	236,470	14,084	324,400	22,500
Squid					370	10			192	5
Total	457,559	20,424	84,550	3,256	1,188,838	35,413	4,965,333	81,732	8,478,508	204,646

SEED OYSTER FISHERY: BY GEAR

Item	Tongs		Rakes		By hand		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen, on boats and shore:	*Number*		*Number*		*Number*		*Number*	
Regular	1,562		130		178		1,650	
Casual	67						67	
Total	1,629		130		178		1,717	
Boats:								
Motor	802				2		804	
Other	226		130		80		286	
Apparatus: Number	1,474		130					
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	559,920	$57,940			14,700	$2,940	574,620	$60,880
Seed, public, fall	781,140	79,114			34,100	6,820	815,240	85,934
Seed, private, spring	7,300	1,760	21,000	$4,200	7,300	1,760	35,600	7,720
Seed, private, fall	12,400	2,480	41,400	8,280	3,000	600	56,800	11,360
Total	1,360,760	141,294	62,400	12,480	59,100	12,120	1,482,260	165,894

Fisheries of Virginia, 1933—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Accomac		Elizabeth City		Gloucester		Isle of Wight	
OPERATING UNITS								
	Number		*Number*		*Number*		*Number*	
Fishermen, on boats and shore: Regular	140		43		182		512	
Boats:								
Motor	50		24		128		222	
Other	20						26	
Apparatus: Tongs	92		33		144		466	
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	25,400	$5,080	12,100	$1,210	10,500	$1,050	256,600	$25,660
Seed, public, fall	40,600	8,120	21,300	2,130	31,700	3,170	326,400	32,640
Total	66,000	13,200	33,400	3,340	42,200	4,220	583,000	58,300

Item	James City		Mathew		Middlesex		Nansemond		New Kent	
OPERATING UNITS										
Fishermen, on boats and shore:	*Number*		*Number*		*Number*		*Number*		*Number*	
Regular	9		48		54		108			
Casual									4	
Boats: Motor	5		32		54		51		2	
Apparatus: Tongs	7		48		54		87		4	
CATCH										
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	3,700	$370	6,400	$640	5,480	$1,096	34,400	$3,440	900	$90
Seed, public, fall	7,800	780	14,600	1,460			31,800	3,180	2,900	290
Total	11,500	1,150	21,000	2,100	5,480	1,096	66,200	6,620	3,800	380

Item	Norfolk		Northampton		Warwick		York	
OPERATING UNITS								
Fishermen, on boats and shore:	*Number*		*Number*		*Number*		*Number*	
Regular	51		180		215		108	
Casual	28				35			
Total	79		180		250		108	
Boats:								
Motor	19				143		74	
Other	60		180					
Apparatus:								
Tongs	79		140		219		101	
Rakes			130					
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	21,740	$2,174	3,300	$660	166,800	$16,680	27,300	$2,730
Seed, public, fall	65,340	6,534	3,500	700	211,900	21,190	57,400	5,740
Seed, private, spring			35,600	7,720				
Seed, private, fall			56,800	11,360				
Total	87,080	8,708	99,200	20,440	378,700	37,870	84,700	8,470

NOTE.—Of the total number of persons fishing for seed oysters, 1,636 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 744 motorboats, 267 other boats, and 1,161 tongs.

WINTER TRAWL FISHERY OFF NEW JERSEY, MARYLAND, VIRGINIA, AND NORTH CAROLINA

The catch in the winter trawl fishery off the coasts of southern New Jersey, Maryland, Virginia, and North Carolina (excluding the shrimp fishery) in 1933 amounted to 18,789,969 pounds of fishery products, valued at $506,513 to the fishermen. Craft whose home port was in Massachusetts accounted for 57 percent of the total volume and 56 percent of the value, while Virginia craft accounted for 29 percent of the volume and 26 percent of the value. The principal species contributing to the catch were croaker, sea bass, flounders, and scup.

Statistics of the winter trawl fishery are included also in the catch data for the various States published elsewhere in this report.

Winter trawl fishery off New Jersey, Maryland, Virginia, and North Carolina, 1933

CATCH: BY STATES[1]

Species	Massachusetts		Connecticut		New York		New Jersey	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	4,974	$360	113	$9	292	$19	3,434	$199
Butterfish	70,871	2,637	87	3	17,802	634	22,800	695
Cod	8,398	291	-------	-------	150	2	12,090	233
Croaker	2,490,145	35,696	2,738	46	76,305	1,357	367,623	7,125
Cunners	152	2	-------	-------	-------	-------	-------	-------
Drum:								
Black	32	1	100	1	447	9	-------	-------
Red	1,755	32	-------	-------	-------	-------	555	9
Eels, conger	38,020	703	190	4	3,260	57	4,704	126
Flounders	2,147,253	82,289	87,969	3,827	523,966	22,355	628,634	26,622
Grayfish	2,932	36	-------	-------	-------	-------	-------	-------
Haddock	299	4	-------	-------	-------	-------	-------	-------
Hake	89,935	1,372	275	5	14,526	203	9,204	149
King whiting or "kingfish"	25,296	645	451	12	2,611	90	6,942	274
Mackerel	395	6	-------	-------	150	6	37	1
Mullet	-------	-------	-------	-------	-------	-------	267	8
Pigfish	3,832	73	-------	-------	-------	-------	151	4
Pollock	660	10	-------	-------	-------	-------	-------	-------
Scup or porgy	1,645,178	37,422	16,587	536	249,466	5,719	248,156	6,209
Sea bass	3,701,867	108,239	2,270	142	114,522	4,551	102,439	3,943
Shad	28	2	-------	-------	-------	-------	-------	-------
Sheepshead	9	1	-------	-------	-------	-------	9	1
Skates	108	2	-------	-------	725	7	-------	-------
Spot	31,758	346	50	1	816	23	1,126	22
Squeteagues or "sea trout":								
Gray	286,547	8,543	320	17	13,741	600	32,715	1,065
Spotted	-------	-------	-------	-------	-------	-------	30	2
Striped bass	17	1	-------	-------	11	1	-------	-------
Sturgeon	2,950	371	44	5	365	33	641	47
Tautog	688	20	-------	-------	60	1	149	3
Whiting	590	7	-------	-------	900	9	-------	-------
Crabs, hard	-------	-------	-------	-------	-------	-------	60	1
Lobsters	1,588	130	163	20	1,421	127	1,105	121
Shrimp	40,900	2,045	-------	-------	12	1	841	123
Scallops, sea	156	35	-------	-------	297	47	170	42
Squid	22,170	489	480	13	2,446	77	3,370	85
Total	10,619,503	281,810	111,837	4,641	1,024,291	35,928	1,447,252	47,109

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[1] The data as shown for the various States represent the catch of craft whose principal fishing ports are in such States.

Winter trawl fishery off New Jersey, Maryland, Virginia, and North Carolina, 1933—Continued

CATCH: BY STATES—Continued

Species	Virginia		Georgia		Florida		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	217	$2					217	$2
Bluefish	28,059	2,205			153	$10	37,025	2,802
Butterfish	52,601	1,536			393	12	164,554	5,517
Cod	315	6					20,953	532
Croaker	2,607,106	45,318			73,267	1,029	5,617,184	90,571
Cunners							152	2
Drum:								
Black							579	11
Red	4,418	72	20	$1	180	6	6,928	120
Eels, conger	1,175	16					47,349	906
Flounders	676,579	27,014			79,137	2,852	4,143,538	164,959
Grayfish							2,932	36
Haddock	47	1					346	5
Hake	19,060	311			15	1	133,015	2,041
King whiting or "kingfish"	34,747	1,188			137	4	70,184	2,213
Mackerel	120	6					702	19
Mullet							267	8
Pigfish	3,300	65			45	1	7,328	143
Pollock							660	10
Scup or porgy	1,148,135	22,756			33,768	322	3,341,290	72,964
Sea bass	303,539	8,628			11,430	505	4,236,067	126,008
Shad							28	2
Sharks	10,225	159	955	28			11,180	187
Sheepshead							18	2
Skates							833	9
Spot	26,552	492			536	10	60,838	894
Squeteagues or "sea trout":								
Gray	361,235	13,094			17,076	404	711,634	23,723
Spotted	595	31					625	33
Striped bass							28	2
Sturgeon	3,195	484			187	16	7,382	956
Shellfish	1,065	53	39	2			1,104	55
Tautog	488	9			83	1	1,468	34
White perch	102	3					102	3
Whiting							1,490	16
Crabs, hard							60	1
Lobsters	131	2					4,408	400
Shrimp	371	20					42,124	2,189
Scallops, sea	72,450	8,050					73,073	8,174
Squid	13,353	288	65	1	420	11	42,304	964
Total	5,369,180	131,809	1,079	32	216,827	5,184	18,789,969	506,513

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1933 amounted to 611,425 in number, 1,837,623 pounds in weight, and their total value to the fishermen was $149,114. The catch of alewives for the same season amounted to 17,238,850 in number, with a total weight of 6,895,540 pounds, and a value to the fishermen of $23,845. These figures show a decrease of 19 percent in the weight and 14 percent in the value of shad as compared with 1932, and an increase of 1 percent in the weight but a decrease of 1 percent in the value of alewives.

About 57 percent of the shad, in weight, were taken with pound nets, and 43 percent, with gill nets. Less than one-half of 1 percent were taken with haul seines. More than 99½ percent of alewives were taken with pound nets, only small quantities being taken with gill nets, haul seines, and fyke nets.

Statistics of the catch of shad and alewives in the Potomac River are included also in the catch data for Maryland and Virginia which are published elsewhere in this report.

Shad and alewife fisheries of the Potomac River, 1933

Item	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen on boats and shore:									
Regular	49			322			371		
Casual	119			161			280		
Total	168			483			651		
Boats:									
Motor	58			183			241		
Other	50			97			147		
Apparatus:									
Pound nets	67			300			367		
Gill nets	1,251			885			2,136		
Square yards	236,557			230,790			467,347		
Haul seines	1						1		
Length, yards	200						200		
Fyke nets				3			3		
Shad caught:									
With pound nets	17,714	60,833	$6,237	342,971	990,532	$90,705	360,685	1,051,365	$96,942
With gill nets	33,260	114,932	9,222	217,417	671,126	42,927	250,677	786,058	52,149
With haul seines	63	200	23				63	200	23
Total	51,037	175,965	15,482	560,388	1,661,658	133,632	611,425	1,837,623	149,114
Alewives caught:									
With pound nets	1,209,060	483,624	2,277	15,961,865	6,384,746	21,207	17,170,925	6,868,370	23,484
With gill nets	10,500	4,200	60	48,675	19,470	282	59,175	23,670	342
With haul seines	1,250	500	10				1,250	500	10
With fyke nets				7,500	3,000	9	7,500	3,000	9
Total	1,220,810	488,324	2,347	16,018,040	6,407,216	21,498	17,238,850	6,895,540	23,845

TRADE IN FISHERY PRODUCTS IN WASHINGTON, D. C.[9]

The municipal fish wharf and market in Washington, D. C., is located in the southwestern part of the city on an arm of the Potomac River. At the present time 17 firms have stalls in the market, 2 firms are in private buildings across the street, and 4 firms have stalls in the new Center Market. Altogether the 23 above firms employed 111 persons who received $79,186 in salaries and wages during 1933. Of the total employees 95 were regularly employed. These firms conduct a wholesale and retail business, chiefly wholesale, however.

During the year 1933 the receipts of fresh and frozen fishery products as received at the municipal fish wharf amounted to 9,572,135 pounds. This is a decrease of 16 percent as compared with the year 1932 but an increase of 2 percent as compared with the 5-year average.

During 1933 three firms in Washington, D. C., smoked fishery products which amounted to 257,825 pounds, valued at $27,806. Of this amount 230,000 pounds, valued at $20,880, consisted of herring smoked as bloaters; 24,400 pounds, valued at $6,292, were whitefish; while the remainder or 3,425 pounds, valued at $634, consisted of alewives or "river herring", eels, and haddock.

There were three firms which shucked oysters mostly for hotel and restaurant trade. Their production amounted to 6,100 gallons, valued at $9,600. In addition to this quantity there were 42,245 gallons of oysters, valued at $78,160, shucked mostly by fishermen for retail trade. Virtually all of the fishery products were consumed in the city.

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[9] Statistics of fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department, District of Columbia.

Fishery products received at municipal fish wharf and market, Washington, D. C., 1933

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Alewives (river herring)	6,700	18,000	73,400	318,800	142,700								559,600
Bluefish	1,500	4,200	6,200	6,300	43,800	30,600	15,900	21,600	26,200	34,100	12,800	5,600	208,800
Butterfish	2,700	2,600	2,300	6,400	31,900	75,500	35,200	55,300	26,200	36,900	15,400	2,900	293,300
Carp	11,500	6,300	10,700	21,600	15,600	5,800	4,100	1,300	6,600	5,100	5,500	6,400	100,500
Catfish	2,300	8,400	21,700	26,600	8,500	5,100	2,300	300	4,800	12,700	11,000	2,600	106,300
Cod	1,000	1,200	600	1,100	700	200		400	500	800	600	800	7,900
Croaker	103,600	101,400	58,500	280,000	269,100	233,000	284,000	306,800	116,600	149,000	181,400	172.200	2,255,600
Drum, red or redfish	9,000		1,400	6,000	680	110	500		2,800	4,400	4,900	2,900	32,690
Eels	600		600	3,800	400	100			1,100	1,400	1,800	200	10,000
Flounders	53,500	44.400	42,100	26,800	31,700	36,000	19,400	20,400	8.500	20,100	33,500	24,300	360,700
Gizzard shad	24,500	7,500	22,200	5,100					200	2,300	1,500	300	63.600
Haddock	28.525	33.310	27,490	38,105	32,970	25,120	16,230	30,560	21,520	21,330	31,720	20,180	327,060
Hake	1,700	1,200									400	200	3,500
Halibut	6,900	5,900	9,600	6,800	5,400	3,300	4,500	4,400	5,200	7,200	5,600	4,000	68,800
Hickory shad or "jacks"	5,300	2,300	2,300	1,300	200								11,400
Hogfish								200	200	3,300	300		4,000
Kingfish or "king mackerel"	1,400	1,400	600	17,800		200		600			1,900	1,700	25,600
Mackerel	33,100	28,000	18,400	16,600	16,700	25,200	12,600	22,200	18,400	20,600	16,700	21,400	249,900
Menhaden											200		200
Mullet	5,400	2,100	700	3,000				800	5,300	7,600	8,700	4.000	37.600
Perch	4,700	6,800	24,700	30,900	4,400	800	900	900	2,100	6,300	5,900	5,800	94.200
Pike or pickerel	800			1,500	600						700	600	4,200
Pollock	200					100	400	200			400	9,200	10,500
Pompano	200	100	800	200	600	200	700	1,300	300	200	300	100	5,000
Salmon	4,800	2.500	3,000	1,200	1.200	1,200	3,000	3,200	5,000	8,300	7,900	3,100	44.400
Scup of porgy	8,200	23 000	20 400	8,800	11,500	10,700		1,600	2,800	2,300	1,700	200	91,200
Sea bass	70,400	82,500	119,600	30,800	7,500	19,000	7,400	7,700	2,500	4,300	4,700	7,500	363.900
Shad	22,200	26,165	70,700	194,200	244,100	15,600					900		573,865
Sheepshead											100		100
Smelt	2,580	3,540	2,220	1,275					15		180	1,020	10,830
Snapper, red	1,000	300	400	650	450	300	200	300	300	200	300	600	5,000
Spot	1,100	200			6,200	16,300	35,200	26,200	27,900	42.000	14,400	500	170.000
Squeteagues or "sea trout"	95,900	66,000	100,100	83,800	287,300	232,700	108,300	178.600	226,500	279.800	128.800	106,100	1,893.900
Striped bass	8,500	5,900	27,100	33,220	11,200	2,600	900	1,100	4,900	23,700	23,300	7,100	149,520
Sturgeon	200			100	500					50	200	295	1,345
Swordfish						100	350	600	507	585	452	125	2,719
Tilefish	200			100							200	100	600
Whitefish		300		200									500
Whiting	600										800	500	1,900
Yellowtail	2,000			200						600			2,800

Crabs:													
Hard			150	3, 375	24, 750	58, 500	62, 025	38, 925	32, 175	4, 500	450		224, 850
Soft			2, 250	4, 455	19, 800	31, 590	10, 485	18, 135	23, 085	12, 015	990		122, 805
Oyster		25											25
Meat	4, 240	3, 180	5, 485	15, 355	20, 640	29, 205	22, 950	28, 770	18, 925	16, 605	12, 330	3, 805	190, 490
Sea crawfish or "spiny lobster":													
Alive	100	50		50						75	200	50	525
Meat		60	25										85
Lobsters:													
Alive	1, 080	800	720	1, 240	2, 920	1, 410	440	750	750	950	910	600	12, 570
Meat	105	145	120	50	145	80	50	155	80	190	190	220	1, 530
Shrimp	5, 650	5, 400	5, 100	7, 250	9, 600	11, 475	9, 385	21, 515	12, 268	13, 362	8, 085	6, 050	115, 140
Squid	1, 400		700						100	100	300	100	2, 700
Clams:													
Hard	6, 112	6, 080	8, 960	5, 664	8, 032	7, 776	5, 376	5, 888	6, 016	8, 256	5, 088	4, 512	[1] 77, 760
Soft	16												16
Oysters:													
In the shell (meat)	50, 645	31, 794	27, 622	9, 807	574			70	8, 498	30, 611	35, 140	23, 408	[2] 218, 169
Opened (meat)	66, 132	64, 286	55, 099	18, 682	656				17, 859	58, 739	75, 504	66, 062	[3] 423, 019
Scallops	1, 072	1, 552	1, 160	1, 952	2, 128	3, 672	920	2, 384	2, 904	5, 160	2, 416	1, 016	26, 336
Frogs				183	18	100	13		63	60	43	15	500
Terrapin											82		82
Turtles:													
Sea					180								180
Snapper	1, 528	140		128	28								1, 824
Total	660, 885	599, 027	775, 201	1, 241, 441	1, 274, 371	883, 638	663, 724	803, 152	639, 665	845, 788	666, 885	518, 358	9, 572, 135

[1] 9,720 bushels.
[2] 31,167 bushels.
[3] 48,345 gallons.

NOTE.—Hard clams have been converted to pounds on the basis of 8 pounds of meats to the bushel, and oysters on the basis of 7 pounds of meats to the bushel, and 8¾ pound to the gallon.

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, Area XXIV; Gulf, Area XXV)[1]

The most recent complete catch statistics for the fisheries of the South Atlantic and Gulf States are those collected for the year 1932 and the most recent complete statistics on fisheries wholesale and manufacturing industries in the same region are for 1931. The yield of the commercial fisheries in the marine areas of these States, comprised of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, during 1932, amounted to 299,916,728 pounds, valued at $6,428,385, to the fishermen, representing an increase of 4 percent in volume but a decrease of 20 percent in value as compared with the catch in 1931. Detailed statistics of the operating units and catch of these fisheries for 1932 appear in "Fishery Industries of the United States, 1933", Appendix I to the Report of the Commissioner of Fisheries for the fiscal year 1934, while data on wholesale and manufacturing industries for 1931 are published in "Fishery Industries of the United States, 1932", Appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries appears in the following tables.

Fisheries of the South Atlantic and Gulf States, 1932

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	758	17	86	638	139	474	154	143	2,409
On boats and shore:									
Regular	2,754	615	427	5,988	360	829	1,864	1,223	14,060
Casual	1,411	843	539	1,331	90	205	289	383	5,091
Total	4,923	1,475	1,052	7,957	589	1,508	2,307	1,749	21,560
Vessels:									
Motor	79	4	20	98	31	114	62	33	441
Net tonnage	1,234	59	245	2,467	299	1,507	447	388	6,646
Sail	53			1		15	2		71
Net tonnage	502			64		237	38		841
Total vessels	132	4	20	99	31	129	64	33	512
Total net tonnage	1,736	59	245	2,531	299	1,744	485	388	7,487
Boats:									
Motor	1,154	84	119	2,318	153	268	574	382	5,052
Other	1,584	773	523	2,945	151	407	996	418	7,797
Accessory boats	70		4	11					85
Apparatus:									
Purse seines:									
Menhaden	33		2	5					40
Length, yards	8,025		600	1,450					10,075
Other	1			1					2
Length, yards	175			400					575
Haul seines:									
Common	454	20	11	110	5	3	102	54	759
Length, yards	66,326	2,780	1,105	34,300	2,900	800	13,434	9,315	130,960
Long	56			76					132
Length, yards	58,275			59,200					117,475
Gill nets:									
Anchor	1,661	324	45	12					2,042
Square yards	908,610	154,872	10,625	9,600					1,083,707

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[1] These are the numbers given to these areas by the North American Council on Fishery Investigations. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the South Atlantic and Gulf States, 1932—Continued

OPERATING UNITS: BY STATES—Continued

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Apparatus—Con.									
Gill nets.—Con.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Drift	227	323	158	146					854
Square yards	399, 265	284, 554	111, 863	139, 606					935, 288
Runaround	188	7	10	2, 111				47	2, 363
Square yards	83, 500	1, 450	3, 170	2, 110, 492				13, 165	2, 211, 777
Stake	5, 271		40	5	18			267	5, 601
Square yards	561, 965		10, 050	1, 250	2, 880			74, 845	650, 990
Trammel nets				182	53	39	23	61	358
Square yards				122, 469	17, 365	15, 775	6, 985	22, 071	184, 665
Lines:									
Hand	86	180	43	1, 620	149	132	167	467	2, 844
Hooks	166	550	46	2, 573	260	142	172	594	4, 503
Troll	45			1, 190	2			8	1, 245
Hooks	45			1, 485	2			8	1, 540
Trot with baits or snoods	156	6	31	13	15	36	318	25	600
Baits or snoods	119, 000	4, 500	9, 390	2, 700	2, 336	8, 895	60, 025	3, 175	210, 021
Trot with hooks	26		40	198	101		3	48	416
Hooks	3, 200		2, 840	85, 005	10, 370		300	6, 915	108, 630
Pound nets	1, 722			13					1, 735
Weirs	2								2
Wheels	21								21
Stop nets				7					7
Square yards				11, 475					11, 475
Fyke nets	801			278	6				1, 085
Dip nets:									
Common	204			50					254
Drop				54		130	1, 520		1, 704
Cast nets			10	16		60	18		104
Otter trawls:									
Fish	2			4					6
Yards at mouth	41			109					150
Shrimp	51	28	125	376	112	255	476	251	1, 674
Yards at mouth	1, 007	560	2, 510	7, 135	1, 465	3, 154	5, 942	3, 634	25, 407
Pots:									
Crab			12	1, 433					1, 445
Eel	1, 285			40					1, 325
Fish	465		81	1, 515					2, 061
Sea crawfish				3, 190					3, 190
Spears	50	6		27	30	63		152	328
Dredges:									
Clam				1					1
Oyster	182			2		328	26	39	577
Yards at mouth	182			2		329	26	38	577
Scallop	64								64
Yards at mouth	64								64
Tongs	387	6	120	413	142	245	465	222	2, 000
Rakes	483		4						487
Forks				40					40
Grabs		333	60						393
Coquina scoops				3					3
Hooks, sponge				201					201
Diving apparatus				54					54

CATCH: BY STATES[1]

Species	North Carolina		South Carolina		Georgia	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6, 584, 000	$41, 899				
Black bass	31, 800	3, 180				
Bluefish	686, 597	16, 409	4, 062	$325		
Bowfin	1, 700	17				
Butterfish	54, 514	786				
Carp	128, 400	6, 640				
Catfish and bullheads	524, 904	9, 600			98, 389	$5, 841
Cero	13, 000	520				
Croaker	4, 540, 356	46, 642			8, 226	329
Drum, red or redfish	87, 200	1, 744	3, 170	108	2, 141	107
Eels	56, 715	1, 877			550	22
Flounders	789, 767	32, 797	5, 175	284	2, 904	88
Gizzard shad	19, 200	161				

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1932—Continued

CATCH: BY STATES—Continued

Species	North Carolina		South Carolina		Georgia	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Grunts	-----	-----	6,300	$220	-----	-----
Hake	1,624	$22	-----	-----	-----	-----
Harvestfish or "starfish"	1,077,381	11,858	-----	-----	-----	-----
Hickory shad	117,325	4,055	11,066	886	9,841	$707
Hogfish	992	12	-----	-----	-----	-----
King whiting or "kingfish"	300,048	4,033	16,210	610	19,746	617
Menhaden	54,476,000	75,135	-----	-----	11,520,000	16,000
Mullet	2,472,050	51,655	148,050	6,042	52,627	1,904
Pigfish	62.200	627	-----	-----	-----	-----
Pike or pickerel	5,200	393	-----	-----	-----	-----
Pinfish or sailors choice	270,000	1,012	-----	-----	-----	-----
Pompano	150	22	-----	-----	-----	-----
Scup	5,615	172	-----	-----	-----	-----
Sea bass	202,495	6,251	218,750	8,187	32,000	960
Shad	924,994	125,926	123,036	15,459	288,145	45,111
Sharks	-----	-----	8,000	80	-----	-----
Sheepshead	2,650	53	-----	-----	-----	-----
Spanish mackerel	77,900	3,660	-----	-----	-----	-----
Spot	1,587,555	17,821	10,000	400	9,542	351
Squeteagues or "sea trout":						
Gray	3,636,323	64,097	2,460	148	2,000	120
Spotted	1,895.700	78,363	14,355	1,048	46,210	3,357
Striped bass	506,760	54,516	-----	-----	-----	-----
Sturgeon	1,661	179	23,340	3,734	4,965	397
Suckers	450	9	-----	-----	-----	-----
Sunfish	55,250	1,105	-----	-----	-----	-----
White perch	831,600	21,302	-----	-----	-----	-----
Yellow perch	179,900	4,871	-----	-----	-----	-----
Total	82,209,976	689,421	593,974	37,531	12,097,286	75,911
SHELLFISH, ETC.						
Crabs:						
Hard [2]	1,847,600	18,448	16,000	320	225,492	3,383
Soft	308,555	33,921	-----	-----	-----	-----
Shrimp	292,104	9,393	1,500,687	32,529	3,601,564	89,547
Clams:						
Hard, public [3]	260,624	17,278	4,800	600	600	75
Oysters: [4]						
Market, public, spring	626,462	25,067	1,205,886	21,569	-----	-----
Market, public, fall	563,478	25,613	475,704	10,175	-----	-----
Market, private, spring	10,216	559	429,460	9,646	413,121	8,789
Market, private, fall	1,200	100	306,791	10,466	175,287	6,881
Scallops, bay	91,458	6,560	-----	-----	-----	-----
Octopus	-----	-----	1,200	72	-----	-----
Squid	763	13	-----	-----	-----	-----
Terrapin, diamond-back	1,557	370	1,786	483	9,645	1,356
Total	4.004,017	137.322	3,942,314	85,860	4,425,709	110,031
Grand total	86,213,993	826,743	4,536,288	123,391	16,522,995	185,942

Species	Florida		Alabama		Mississippi	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	79,947	$437	-----	-----	-----	-----
Amberjack	4,577	122	-----	-----	-----	-----
Barracuda	4,245	130	-----	-----	-----	-----
Black bass	278,477	18,518	-----	-----	-----	-----
Bluefish	1,421,233	60,614	12,401	$563	4,730	$86
Blue runner or hardtail	162,507	2,311	924	17	-----	-----
Buffalofish	-----	-----	11,829	323	-----	-----
Butterfish	997	47	-----	-----	-----	-----
Cabio or crab eater	5.145	103	550	15	110	2
Catfish and bullheads	3,531,636	116,214	60,211	2,736	27,115	493
Cero	275	4	-----	-----	-----	-----
Cigarfish	9,350	170	-----	-----	-----	-----
Cod	2,039	43	-----	-----	-----	-----
Crappie	404,926	11,866	-----	-----	-----	-----
Crevalle	22,751	518	259	5	990	9
Croaker	25,775	431	18,111	330	10,835	191
Dolphin	12,050	361	-----	-----	-----	-----
Drum:						
Black	48,010	817	742	14	8,937	115
Red or redfish	764,784	11,894	44,292	2,645	75,100	2,062
Eels	7,560	153	-----	-----	-----	-----
Flounders	455,131	12,365	21,490	1,668	46,540	2,129
Frigate mackerel	2,250	90	-----	-----	-----	-----

Fisheries of the South Atlantic and Gulf States, 1932—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Groupers	3,163,878	$64,600	99,746	$1,998	16,117	$322
Grunts	44,391	1,297	-------	-------	-------	-------
Hake	8,218	165	-------	-------	-------	-------
Hickory shad	28,147	507	-------	-------	-------	-------
Hogfish	28,430	853	-------	-------	-------	-------
Jewfish	30,290	1,034	-------	-------	-------	-------
Kingfish or "king mackerel"	3,294,501	119,514	880	40	-------	-------
King whiting or "kingfish"	285,059	6,880	3,718	68	2,728	45
Ladyfish	2,622	39	-------	-------	-------	-------
Menhaden	23,349,860	41,220	-------	-------	-------	-------
Mojarro	35,589	514	-------	-------	-------	-------
Mullet	21,141,449	338,254	696,958	10,673	564,970	8,235
Muttonfish	203,135	8,811	-------	-------	-------	-------
Paddlefish or spoonbill cat	-------	-------	1,320	60	-------	-------
Permit	2,850	107	-------	-------	-------	-------
Pigfish	66,548	948	-------	-------	-------	-------
Pinfish or sailors choice	24,975	485	-------	-------	-------	-------
Pompano	581,263	80,087	3,144	436	132	12
Porgies	25,786	512	-------	-------	-------	-------
Porkfish	363	7	-------	-------	-------	-------
Scup	247,792	5,936	-------	-------	-------	-------
Sea bass	250,995	8,102	-------	-------	-------	-------
Shad	546,086	52,940	-------	-------	-------	-------
Sharks	5,043,000	12,005	-------	-------	-------	-------
Sheepshead	535,330	8,456	4,441	120	23,815	539
Snapper:						
Mangrove	95,580	2,407	-------	-------	-------	-------
Red	4,588,265	228,536	621,573	30,263	36,812	1,841
Snook or sergeantfish	301,780	6,936	-------	-------	-------	-------
Spanish mackerel	6,337,598	209,836	8,028	292	-------	-------
Spot	68,360	925	401	7	-------	-------
Squeteagues or "sea trout":						
Gray	21,418	676	6,050	110	103,015	1,873
Spotted	2,666,525	106,425	103,224	9,392	124,394	4,524
Sturgeon	4,379	199	10,742	977	-------	-------
Sunfish	662,494	16,831	-------	-------	-------	-------
Tenpounder	77,845	1,349	1,400	14	350	4
Tripletail	890	18	-------	-------	176	4
Tuna or "horse mackerel"	3,350	134	-------	-------	-------	-------
Turbot	4,125	124	-------	-------	-------	-------
Yellowtail	91,870	4,441	-------	-------	-------	-------
Total	81,108,701	1,569,398	1,792,434	62,766	1,046,866	22,486
SHELLFISH, ETC.						
Crabs:						
Hard [2]	82,182	3,519	70,070	982	320,107	4,665
Soft	-------	-------	1,280	236	3,572	893
Stone	153,825	8,335	-------	-------	-------	-------
Sea crawfish or spiny lobster	445,547	32,078	-------	-------	-------	-------
Shrimp	18,136,334	535,198	3,381,700	71,910	14,009,720	267,428
Clams:						
Coquina	5,400	335	-------	-------	-------	-------
Hard, public [3]	1,120,812	42,742	-------	-------	-------	-------
Conchs	1,500	120	-------	-------	-------	-------
Oysters: [4]						
Market, public, spring	542,438	27,493	748,952	27,216	4,472,358	169,783
Market, public, fall	659,715	35,668	88,485	3,892	749,962	32,162
Market, private, spring	186,558	7,886	3,960	220	-------	-------
Market, private, fall	113,495	6,320	17,820	990	-------	-------
Scallops, bay	61,965	6,885	-------	-------	-------	-------
Squid	7,553	147	-------	-------	-------	-------
Frogs	-------	-------	697	104	-------	-------
Terrapin, diamond-back	-------	-------	1,089	275	-------	-------
Turtles, soft-shell	51,669	336	-------	-------	-------	-------
Sponges						
Grass	181,367	37,319	-------	-------	-------	-------
Sheepswool	277,087	593,674	-------	-------	-------	-------
Velvet	71	20	-------	-------	-------	-------
Wire	29,466	13,387	-------	-------	-------	-------
Yellow	124,536	52,524	-------	-------	-------	-------
Total	22,181,520	1,403,986	4,314,053	105,825	19,555,719	474,931
Grand total	103,290,221	2,973,384	6,106,487	168,591	20,602,585	497,417

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1932—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					6, 663, 947	$42, 336
Amberjack					4, 577	122
Barracuda					4, 245	180
Black bass					310, 277	21, 698
Bluefish			1, 760	$80	2, 130, 783	78, 077
Blue runner or hardtail					163, 431	2, 328
Bowfin					1, 700	17
Buffalofish					11, 829	323
Butterfish					55, 511	833
Cabio or crab eater					5, 805	120
Carp					128, 400	6, 640
Catfish and bullheads	44, 850	$1, 583	76, 825	2, 752	4, 363, 930	139, 219
Cero					13, 275	524
Cigarfish					9, 350	170
Cod					2, 039	43
Crappie					404, 926	11, 866
Crevalle	300	9			24, 300	541
Croaker	44, 470	1, 924	27, 025	576	4, 674, 798	50, 423
Dolphin					12, 050	361
Drum:						
Black	87, 412	2, 704	932, 091	17, 153	1, 077, 192	20, 803
Red or redfish	281, 739	14, 493	824, 819	45, 322	2, 083, 245	78, 375
Eels					64, 825	2, 052
Flounders	4, 405	314	70, 515	4, 614	1, 395, 927	54, 259
Frigate mackerel					2, 250	90
Garfish	300	15			300	15
Gizzard shad					19, 200	161
Groupers	3, 400	68	18, 301	380	3, 301, 442	67, 368
Grunts					50, 691	1, 517
Hake					9, 842	187
Harvestfish or "starfish"					1, 077, 381	11, 858
Hickory shad					166, 379	6, 155
Hogfish					29, 422	865
Jewfish	2, 400	48	5, 750	165	38, 440	1, 247
Kingfish or "king mackerel"			5, 280	162	3, 300, 661	119, 746
King whiting or "kingfish"	16, 000	374	8, 535	155	652, 044	12, 782
Ladyfish					2, 622	39
Menhaden					89, 345, 860	132, 355
Mojarro					35, 589	514
Mullet	6, 300	155	4, 950	90	25, 087, 354	417, 008
Muttonfish					203, 135	8, 811
Paddlefish or spoonbill cat					1, 320	60
Permit					2, 850	107
Pigfish					128, 748	1, 575
Pike or pickerel					5, 200	393
Pinfish or sailors choice					294, 975	1, 497
Pompano	90	11	5, 159	469	589, 938	81, 037
Porgies					25, 786	512
Porkfish					363	7
Scup					253, 407	6, 108
Sea bass					704, 240	23, 500
Shad					1, 882, 261	239, 436
Sharks					5, 051, 000	12, 085
Sheepshead	77, 673	4, 019	29, 154	599	673, 063	13, 786
Snapper:						
Mangrove					95, 580	2, 407
Red	66, 884	4, 013	985, 291	50, 076	6, 358, 825	314, 729
Snook or sergeantfish			20, 893	569	322, 673	7, 505
Spanish mackerel	400	16	41, 140	2, 616	6, 465, 066	216, 420
Spot	3, 450	87			1, 679, 308	19, 591
Squeteagues or "sea trout":						
Gray	220, 471	6, 603			3, 991, 737	73, 627
Spotted	412, 427	31, 607	976, 344	63, 660	6, 239, 179	298, 376
Striped bass			495	18	507, 255	54, 534
Sturgeon					45, 087	5, 486
Suckers					450	9
Sunfish					717, 744	17, 936
Tenpounder					79, 595	1, 367
Tripletail	990	49			2, 056	71
Tuna or "horse mackerel"					3, 350	134
Turbot					4, 125	124
White perch					831, 600	21, 302
Yellow perch					179, 900	4, 871
Yellowtail					91, 870	4, 441
Total	1, 273, 961	68, 092	4, 034, 327	189, 456	184, 157, 525.	2, 715, 061

Fisheries of the South Atlantic and Gulf States, 1932—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:						
Hard [2]	5,877,737	$56,776	44,660	$669	8,483,848	$88,762
Soft	99,340	25,258			412,747	60,308
Stone					153,825	8,335
Sea crawfish or spiny lobster					445,547	32,078
Shrimp	38,095,780	800,452	9,244,246	229,529	88,262,135	2,035,986
Clams:						
Coquina					5,400	335
Hard, public [3]					1,386,836	60,695
Conchs					1,500	120
Oysters: [4]						
Market, public, spring	267,672	16,054	442,932	25,591	8,306,700	312,773
Market, public, fall			537,669	27,019	3,075,013	134,529
Market, private, spring	1,164,853	92,616			2,208,168	119,716
Market, private, fall	1,545,536	119,657			2,160,129	144,414
Scallops, bay					153,423	13,445
Octopus					1,200	72
Squid					8,316	160
Frogs					697	104
Terrapin, diamond-back	8,996	1,619			23,073	4,103
Turtles:						
Soft-shell					51,669	336
Loggerhead	6,450	129			6,450	129
Sponges:						
Grass					181,367	37,319
Sheepswool					277,087	593,674
Velvet					71	20
Wire					29,466	13,387
Yellow					124,536	52,524
Total	47,066,364	1,112,561	10,269,507	282,808	115,759,203	3,713,324
Grand total	48,340,325	1,180,653	14,303,834	472,264	299,916,728	6,428,385

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[1] Excluding seed oyster fishery. The seed oyster fishery was prosecuted in this section only in North Carolina where 12 regular fishermen using 6 motor boats and 12 dredges with an aggregate of 12 yards at the mouth took 39,741 bushels of seed oysters, valued at $8,280, from public beds. None of these fishermen, craft, or gear was duplicated among those in the fisheries for market oysters or other species.

[2] Statistics on hard crabs used in this table are based on yields of 3 pounds per dozen in North Carolina; 6 pounds, in South Carolina and Georgia; 7.32 pounds, in Florida; 6.25 pounds, in Mississippi; 6.98 pounds, in Alabama and Texas; and 6.45 pounds, in Louisiana.

[3] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[4] Statistics on market oysters used in this table are based on yields of 5.71 pounds of meats per bushel in North Carolina; 4.76, in South Carolina; 5.69, in Georgia; 3.29, in Florida; 2.40, in Alabama; 2.19, in Mississippi; 4.14, in Louisiana; and 5.05, in Texas.

NOTE.—Of the total catch in North Carolina, 268,136 pounds of fishery products, valued at $5,925, were taken in the winter trawl fishery off Maryland, Virginia, and North Carolina. Of the total catch in Florida, 942,791 pounds of fishery products, valued at $20,607, were taken in the same fishery. These products consisted principally of scup, sea bass, flounders, croakers, and gray squeteague.

Industries related to the fisheries of the South Atlantic and Gulf States

OPERATING UNITS, SALARIES, AND WAGES, 1931

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Transporting:									
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	60	85	8	43	9		147	2	354
On boats	4	39		73	2	16	255		389
Total	64	124	8	116	11	16	402	2	743
Vessels:									
Motor	37	9	4	22	8		71	1	152
Net tonnage	342	101	26	318	68		579	6	1,440
Sail		29		1					30
Net tonnage		263		16					279
Total vessels	37	38	4	23	8		71	1	182
Total net tonnage	342	364	26	334	68		579	6	1,719
Boats	2	41		72	1	8	127		251

Industries related to the fisheries of the South Atlantic and Gulf States—Continued

OPERATING UNITS, SALARIES, AND WAGES, 1931—Continued

Item	North Carolina	South Carolino	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Wholesale and manufacturing:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Establishments	64	28	35	250	20	46	90	52	585
Persons engaged:									
Proprietors	70	23	34	311	27	62	112	61	700
Salaried employees	25	24	22	105	16	31	96	33	352
Wage earners:									
Average for season	669	763	1, 198	2, 447	352	2, 286	3, 287	1, 581	12, 583
Average for year	265	269	273	927	183	968	1, 280	416	4, 581
Paid to salaried employees	$33, 112	$58, 986	$64, 047	$257, 707	$41, 238	$82, 525	$202, 958	$45, 430	$786, 003
Paid to wage earners	$146, 855	$109, 845	$137, 498	$561, 198	$59, 919	$301, 101	$541, 074	$178, 050	$2,035,540
Total salaries and wages	$179, 967	$168, 831	$201, 545	$818, 905	$101, 157	$383, 626	$744, 032	$223, 480	$2,821,543
Fishermen manufacturing	729	10	17	254	46	86	10	227	1, 379

PRODUCTS MANUFACTURED

Item	North Carolina		South Carolina		Georgia		Florida	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Groupers, fresh steaks [1] pounds							254, 000	$26, 200
Menhaden products:								
Acid scrap [1] tons	3, 564	$56, 733			(2)	(2)	150	9, 000
Dry scrap [1] do	2, 566	84, 232					5, 069	138, 475
Fish meal [1] do	737	24, 008					2, 948	81, 776
Oil [1] gallons	233, 866	23, 007			(2)	(2)	666, 111	68, 522
Mullet:								
Salted pounds	278, 000	11, 335					320, 167	12, 754
Roe, salted do							30, 590	6, 485
Crab meat, packaged, fresh-cooked pounds	188, 032	33, 748			18, 250	$5, 844	(2)	(2)
Shrimp:								
Cooked and peeled do					(2)	(2)		
Canned [1] standard cases			(2)	(2)	115, 945	501, 686	86, 013	343, 209
Oysters:								
Fresh-shucked gallons	119, 238	111, 350	20, 514	$21, 668	23, 467	25, 897	113, 629	142, 827
Canned [1] standard cases			93, 082	274, 674	(2)	(2)	(2)	(2)
Crushed shells for poultry feed [1] tons	(2)	(2)	(2)	(2)			65, 383	318, 715
Marine-shell novelties [1]								600
Unclassified products:								
Steaks and fillets, fresh and frozen [1] pounds	(3)	(3)					[4] 29, 000	[4] 5, 194
Canned [1] standard cases		(3)		(3)		(3)	[5] 21, 506	[5] 124, 689
Miscellaneous [7]		[8] 10, 365		[9] 131, 750		[10] 69, 495		[11] 17, 925
Total		354, 828		428, 092		602, 922		1, 296, 371

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[1] Data are for 1933.

[2] This item has been included under "Unclassified products."

[3] This item has been included under "Miscellaneous."

[4] Includes fresh fillets of red drum, grouper, kingfish, mullet, red snapper, Spanish mackerel, squeteagues, and snook; and fresh steaks of red snapper.

[5] Includes canned coquina broth, hard clam products, conch cocktail, oysters, and turtle products.

[7] Both 1931 and 1933 data are included in these items.

[8] Includes canned alewife roe; salted spot; fresh fillets of squeteagues; fresh-shucked hard clams; and oyster shell products.

[9] Includes canned shrimp and oyster-shell products.

[10] Includes cooked and peeled shrimp; fresh-shucked hard clams; canned oysters; and menhaden products.

[11] Includes dry-salted bluefish and Spanish mackerel; fresh-cooked crab meat; fresh-shucked bay scallops, hard clams and conchs; shark hides, fins and oil; oyster-shell lime; and fish scale novelties.

Industries related to the fisheries of the South Atlantic and Gulf States—Continued

PRODUCTS MANUFACTURED—Continued

Item	North Carolina		South Carolina		Georgia		Florida	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By fishermen:								
Alewives:								
Corned ---------- pounds --	2,562,600	$34,975	--------	--------	--------	--------	--------	--------
Tight-pack cut ---- do ----	23,100	817	--------	--------	--------	--------	--------	--------
Tight-pack roe ---- do ----	182,000	7,862	--------	--------	--------	--------	--------	--------
Smoked ----------- do ----	6,000	450	--------	--------	--------	--------	--------	--------
Mullet:								
Salted ------------ do ----	110,000	4,900	--------	--------	--------	--------	475,195	$18,793
Roe, salted -------- do ----	--------	--------	--------	--------	--------	--------	44,114	10,865
Spot, salted --------- do ----	25,000	1,125	--------	--------	--------	--------	--------	--------
Sturgeon caviar ----- do ----	--------	--------	312	$150	--------	--------	12	10
Crab meat, packaged, fresh-cooked ---- pounds --	--------	--------	--------	--------	--------	--------	1,000	500
Clams, hard, fresh-shucked gallons --	200	300	--------	--------	--------	--------	--------	--------
Oysters, fresh-shucked gallons --	15.150	12,120	1,139	1,159	5,648	$5,648	27,915	35,870
Scallops, bay, fresh-shucked ------- gallons --	55,000	56,250	--------	--------	--------	--------	1,265	1,305
Total -----------------	--------	118,829	--------	1,315	--------	5,648	--------	67,343
Grand total -------------	--------	473,657	--------	429,407	--------	608,570	--------	1,363,714

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Groupers, fresh steaks [1] pounds --	(2)	(2)	--------	--------	--------	--------	--------	--------
Crab meat, packaged, fresh-cooked ----------- pounds --	--------	--------	22,500	$5,825	174,550	$47,184	--------	--------
Shrimp:								
Fresh and frozen packaged pounds --	--------	--------	--------	--------	--------	--------	2,086,950	$294,903
Sun-dried ------------ do ----	--------	--------	--------	--------	1,333,568	302,041	--------	--------
Cooked and peeled --- do ----	--------	--------	326,550	81,638	--------	--------	--------	--------
Canned [1] --- standard cases --	73,705	$298,181	119,872	447,072	374,481	1,512,778	70,455	292,301
Meal or "bran" [1] ----- tons --	--------	--------	--------	--------	943	17,550	--------	--
Oysters:								
Fresh-shucked ----- gallons --	20,370	23,424	41,436	42,198	202,015	256,882	65,291	74,448
Canned [1] --- standard cases --	(2)	(2)	183,127	527,221	19,439	60,164	--------	--------
Crushed shells for poultry feed [1] -------------- tons --	(2)	(2)	14,567	46,992	(2)	(2)	--------	--------
Unclassified products:								
Steaks and fillets, fresh and frozen [1] ---------- pounds --	[5] 16,900	[5] 3,757	--------	--------	--------	--------	--------	--------
Canned [1] --- standard cases --	--------	(3)	--------	--------	--------	--------	--------	--------
Miscellaneous [7] -------------	--------	[12] 45,780	--------	[13] 1,728	--------	[14] 610,914	--------	[15] 5,433
Total -----------------	--------	371,142	--------	1,152,674	--------	2,807,513	--------	667,035
By fishermen:								
Crab meat, packaged, fresh-cooked ----------- pounds --	--------	--------	--------	--------	--------	--------	460	115
Shrimp:								
Sun-dried ------------ do ----	--------	--------	--------	--------	13,900	2,780	--------	--------
Meal or "bran" ------ tons --	--------	--------	--------	--------	7	105	--------	--------
Oysters, fresh-shucked gallons --	6,289	6,747	17,133	16,205	--------	--------	46,151	39,718
Total -----------------	--------	6,747	--------	16,205	--------	2,885	--------	39,833
Grand total -------------	--------	377,889	--------	1,168,879	--------	2,810,393	--------	706,918

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[1] This item has been included under "Unclassified products."

[2] This item has been included under "Miscellaneous."

[5] Includes fresh steaks of grouper and red snapper; and fresh and frozen fillets of flounders, red snapper, Spanish mackerel, and squeteagues.

[12] Includes canned oysters and oyster-shell products.

[13] Includes salted mullet and oyster-shell lime.

[14] Includes sun-dried squeteagues and oyster-shell products.

[15] Includes fresh-cooked crab meat and oyster-shell poultry feed.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of manufactured products for the South Atlantic and Gulf States was as follows: By manufacturing establishments, $7,688,627; and by fishermen, $258,805. Some of the above products may have been manufactured from products imported from another State or country, therefore, they cannot be correlated directly with the catch within the State.

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1933 sponges handled on the exchange at Tarpon Springs, Fla., amounted to 373,178 pounds, valued at $420,481. This is a decrease of 13 percent in quantity and 19 percent in value as compared with the transactions on the exchange during 1932. Of the total sponges sold on the exchange during 1933, 107,642 pounds, valued at $184,967, were large wool; 21,689 pounds, valued at $23,983, were medium and small wool; 130,165 pounds, valued at $143,548, were wool rags; 80,164 pounds, valued at $51,487, were yellow; 20,105 pounds, valued at $9,494, were grass; and 13,413 pounds, valued at $7,002, were wire. It is estimated that sponges valued at $95,000 were sold outside the exchange.

FISHERIES OF THE PACIFIC COAST STATES[10]

The yield of the commercial fisheries of the Pacific Coast States (Washington, Oregon, and California) during 1933 amounted to 860,161,216 pounds, valued at $13,987,992 to the fishermen, representing an increase of 53 percent in volume and 47 percent in value as compared with the catch in the previous year. These fisheries gave employment to 18,673 fishermen as compared with 17,882 in 1932.

There were 313 fishery wholesale and manufacturing establishments in the three States in 1933 as compared with 316 in 1931, when the most recent previous survey of such concerns was made. In 1933 these establishments employed 11,993 persons, paid $6,095,492 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at $28,946,754. In 1931 the wholesale and manufacturing firms employed 11,651 persons, paid $6,750,607 in salaries and wages, and produced manufactured products, valued at $28,652,513.

Fisheries of the Pacific Coast States, 1933

SUMMARY OF CATCH

Product	Washington		Oregon		California		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	123, 420, 393	$5, 230, 293	22, 503, 816	$1, 131, 977	694, 598, 850	$6, 430, 698	840, 523, 059	$12, 792, 968
Shellfish, etc	5, 309, 111	453, 598	2, 029, 102	77, 867	7, 969. 054	579, 292	15, 307, 267	1, 110, 757
Whale products					4, 330, 890	84, 267	4, 330, 890	84, 267
Total	128, 729, 504	5, 683, 891	24, 532, 918	1, 209, 844	706, 898, 794	7, 094, 257	860, 161, 216	13, 987, 992

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[10] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. While statistics of the fisheries of California are for the calendar year, those for Oregon and Washington are for the fiscal year ending March 31, except that statistics of the halibut fishery in these latter States are for the calendar year. For a clearer understanding of the statistics published in this section the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Pacific Coast States, 1933—Continued

OPERATING UNITS: BY STATES

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3,112	41	4	3,157	42	33	75
On boats and shore	1,787	2,818	1,251	5,856	2,011	1,416	3,427
Total	4,899	2,859	1,255	9,013	2,053	1,449	3,502
Vessels:							
Steam	3	--------	--------	3	--------	--------	--------
Net tonnage	75	--------	--------	75	--------	--------	--------
Motor	484	20	1	505	21	12	33
Net tonnage	10,421	166	9	10,596	213	120	333
Sail	3	--------	--------	3	--------	--------	--------
Net tonnage	1,319	--------	--------	1,349	--------	--------	--------
Total vessels	490	20	1	511	21	12	33
Total net tonnage	11,845	166	9	12,020	213	120	333
Boats:							
Motor	793	442	640	1,875	1,079	943	2,022
Other	444	164	89	697	51	156	207
Apparatus:							
Purse seines:							
Salmon	241	--------	--------	241	--------	--------	--------
Length, yards	144,118	--------	--------	144,118	--------	--------	--------
Haul seines	59	--------	31	90	32	2	34
Length, yards	5,216	--------	9,550	14,766	15,135	317	15,452
Gill nets:							
Drift:							
Salmon	304	114	434	852	823	485	1,308
Square yards	398,488	207,480	1,206,520	1,812,488	2,588,335	638,260	3,226,595
Set:							
Salmon	4	190	134	328	122	750	870
Square yards	1,080	52,500	34,036	87,616	32,330	114,000	146,332
Lines:							
Trawl, set, and hand	25,215	--------	166	25,381	342	915	1,257
Hooks	521,129	--------	4,725	525,854	10,450	19,775	30,225
Troll	1,580	605	18	2,203	755	515	1,270
Hooks	7,118	2,722	85	9,925	3,397	2,317	5,714
Pound nets	88	105	204	397	35	--------	35
Brush weirs	4	--------	--------	4	--------	--------	--------
Fish wheels	--------	--------	29	29	--------	--------	--------
Dip nets	7	46	150	203	140	--------	140
Drag bag nets	29	4	--------	33	--------	--------	--------
Length, yards	2,382	260	--------	2,642	--------	--------	--------
Reef nets	8	--------	--------	8	--------	--------	--------
Beam trawls	14	--------	--------	14	--------	--------	--------
Yards at mouth	66	--------	--------	66	--------	--------	--------
Otter trawls	16	--------	--------	16	--------	2	2
Yards at mouth	187	--------	--------	187	--------	40	40
Traps:							
Crab	2,800	2,464	--------	5,264	--------	8,340	8,340
Crawfish	--------	--------	--------	--------	1,500	--------	1,500
Tongs, rakes, and shovels	429	2,273	--------	2,702	--------	179	179
Dredges, oyster	--------	4	--------	4	--------	--------	--------
Yards at mouth	--------	4	--------	4	--------	--------	--------

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	34	388	538	1,610	710	3,280	6,512
On boats and shore	455	1,004	539	666	214	2,878	12,161
Total	489	1,392	1,077	2,276	924	6,158	18,673
Vessels:							
Steam	--------	2	--------	--------	--------	2	5
Net tonnage	--------	41	--------	--------	--------	41	119
Motor	15	41	60	184	81	381	919
Net tonnage	132	821	1,560	6,862	4,562	13,937	24,866
Sail	--------	2	--------	--------	--------	2	5
Net tonnage	--------	824	--------	--------	--------	824	2,173
Total vessels	15	45	60	184	81	385	929
Total net tonnage	132	1,686	1,560	6,862	4,562	14,802	27,155

Fisheries of the Pacific Coast States, 1933—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	20	564	208	315	97	1,386	5,283
Other	128	92	63	49	2	334	1,238
Apparatus:							
Purse seines:							
Barracuda	--------	--------	--------	19	--------	19	19
Length, yards	--------	--------	--------	7,942	--------	7,942	7,942
Salmon	--------	--------	--------	--------	--------	--------	241
Length, yards	--------	--------	--------	--------	--------	--------	144,118
Sardine	--------	10	33	80	--------	123	123
Length, yards	--------	3,287	10,960	30,240	--------	44,487	44,487
Tuna	--------	--------	--------	47	--------	47	47
Length, yards	--------	--------	--------	27,129	--------	27,129	27,129
Lampara nets:							
Mackerel	--------	--------	--------	58	17	75	75
Length, yards	--------	--------	--------	23,086	5,610	28,696	28,696
Sardine	--------	18	33	28	6	85	85
Length, yards	--------	6,165	10,101	12,437	2,550	31,253	31,253
Squid	--------	--------	34	--------	--------	34	34
Length, yards	--------	--------	6,507	--------	--------	6,507	6,507
Other	--------	--------	--------	7	--------	7	7
Length, yards	--------	--------	--------	2,220	--------	2,220	2,220
Haul seines	5	1	--------	1	--------	7	131
Length, yards	1,040	165	--------	214	--------	1,419	31,637
Gill nets:							
Drift:							
Barracuda	--------	--------	--------	26	17	43	43
Square yards	--------	--------	--------	240,237	137,003	377,240	377,240
Salmon	128	152	--------	--------	--------	280	2,440
Square yards	122,131	464,138	--------	--------	--------	586,269	5,625,352
Sea bass	--------	2	4	--------	--------	6	6
Square yards	--------	1,060	11,408	--------	--------	12,468	12,468
Shad	--------	188	--------	--------	--------	188	188
Square yards	--------	627,655	--------	--------	--------	627,655	627,655
Set:							
"California halibut"	--------	--------	11	--------	--------	11	11
Square yards	--------	--------	54,733	--------	--------	54,733	54,733
Salmon	--------	--------	--------	--------	--------	--------	1,200
Square yards	--------	--------	--------	--------	--------	--------	233,946
Sea bass	--------	--------	--------	31	21	52	52
Square yards	--------	--------	--------	167,487	110,061	277,548	277,548
Miscellaneous	15	91	82	30	13	231	231
Square yards	11,210	127,602	111,999	26,441	17,180	294,432	294,432
Trammel nets	--------	--------	--------	39	13	52	52
Square yards	--------	--------	--------	259,508	128,713	388,221	388,221
Lines:							
Trawl, set, and hand	265	1,257	980	1,520	1,006	5,028	31,666
Hooks	45,560	140,349	137,972	281,547	55,418	660,846	1,216,925
Troll	1,056	992	442	274	181	2,945	6,418
Hooks	4,601	5,066	2,596	274	181	12,718	28,357
Pound nets	--------	--------	--------	--------	--------	--------	432
Brush weirs	--------	--------	--------	--------	--------	--------	4
Fish wheels	--------	--------	--------	--------	--------	--------	29
Fyke nets	--------	2,591	--------	--------	--------	2,591	2,591
Dip nets	11	8	--------	--------	--------	19	362
Bag nets, shrimp	--------	11	--------	--------	--------	11	11
Length, yards	--------	7,312	--------	--------	--------	7,312	7,312
Drag bag nets	--------	--------	--------	--------	--------	--------	33
Length, yards	--------	--------	--------	--------	--------	--------	2,642
Reef nets	--------	--------	--------	--------	--------	--------	8
Paranzella nets	--------	8	1	4	--------	13	13
Yards at mouth	--------	133	17	67	--------	217	217
Beam trawls	--------	18	--------	--------	--------	18	32
Yards at mouth	--------	120	--------	--------	--------	120	186
Otter trawls	--------	--------	--------	--------	--------	--------	18
Yards at mouth	--------	--------	--------	--------	--------	--------	227
Traps:							
Crab	324	4,803	47	--------	--------	5,179	18,783
Crawfish	--------	--------	--------	--------	--------	--------	1,500
Lobster	--------	--------	--------	4,791	1,308	6,099	6,099
Octopus	--------	--------	51	--------	--------	51	51
Harpoons:							
Swordfish and turtles	--------	--------	--------	34	18	52	52
Whales	--------	2	--------	--------	--------	2	2
Tongs, rakes, and shovels	16	108	38	42	--------	204	3,085
Abalone outfits	--------	--------	16	1	--------	17	17
Dredges, oyster	--------	--------	--------	--------	--------	--------	4
Yards at mouth	--------	--------	--------	--------	--------	--------	4

Fisheries of the Pacific Coast States, 1933—Continued

CATCH: BY STATES

Species	Washington		Oregon	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Carp	74,240	$2,227	8,500	$170
Cod [1]	10,501,381	106,423		
Flounders:				
"Sole"	536,004	15,003	34.412	676
Other	62,027	1,230	32,406	433
Halibut	23,765,161	1,527,349	410,442	23,766
Herring	582,329	5,823	30,038	302
"Lingcod"	669,644	18,406	213,502	3,911
Perch	20,178	732	15,322	193
Pilchard or sardine			7,090	71
Rockfishes	301,621	9,667	48,709	859
Sablefish	1,359,724	41,898	23,816	607
Salmon:				
Blueback, red or sockeye	9,761,564	865,338	104,849	8,913
Chinook or king	17,420,915	1,055,289	13,123,423	794,300
Chum or keta	6,896,559	166,263	1,174,333	14,628
Humpback or pink	38,594,513	906,887	4,667	184
Silver or coho	10,109,215	411,364	4,932.093	189,140
Shad	87,529	1,751	360,744	6,048
Smelt	1,285.648	24,999	545,319	11,955
Steelhead trout	1,345,814	68,632	1,356,421	73,380
Striped bass			24,021	1,038
Sturgeon	39,234	871	51,729	1,284
Tuna and tunalike fishes, albacore			1,980	119
Other fish	7,093	141		
Total	123,420,393	5,230,293	22,503,816	1,131,977
SHELLFISH, ETC.				
Crabs	1,114,424	46,710	1,838,040	55,996
Crawfish			99,000	9,900
Shrimp	52,867	4,229		
Clams:				
Hard	555,067	25,178		
Razor	540,271	77,182	46,347	6,621
Mixed			15,965	950
Octopus	24,113	1,108		
Oysters:				
Eastern, market	1,466	844		
Japanese, market	2,790,750	178,858	25,200	1,800
Native, market	219,968	117,064	4,550	2,600
Scallops	10,185	2,425		
Total	5,309,111	453,598	2,029,102	77,867
Grand total	128,729,504	5,683,891	24,532,918	1,209,844

Species	California [2]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	317,292	$3.855	317,292	$3,855
Barracuda	3,072,962	122,601	3,072,962	122,601
Cabrilla	84,612	2,806	84,612	2.806
Carp	57,856	610	140,596	3,007
Catfish	172,463	19,849	172,463	19,849
Cod [1]	5,534,600	49,670	16,035,981	156,093
Corbina	290	23	290	23
Flounders:				
"California halibut"	989,225	63,328	989,225	63,328
"Sole"	8,306,970	332,726	8,877,386	348,405
Other	1,074,732	43,179	1,169,165	44,842
Flyingfish	16,396	501	16,396	501
Grayfish	471,030	8,685	471,030	8,685
Hake	37,539	361	37,539	361
Halibut	321,664	16,459	24,497,267	1,567,574
Hardhead	156,687	7,684	156,687	7,684
Herring	601,445	3,031	1,213.812	9,156
Horse mackerel	1,010,850	11,921	1,010,850	11,921
Kingfish	564,266	12,153	564,266	12,153
"Lingcod"	1,088,955	35,360	1,972,101	57,677
Mackerel	69,614,899	420,148	69,614,899	420,148
Marlin	6,859	281	6,859	281
Mullet	24,014	1,001	24,014	1,001
Perch	215,014	8,522	250,514	9,447
Pilchard or sardine	509,797,481	1,505,117	509,804,571	1,505,188

[1] The cod were taken off Alaska.

[2] Taken off the Pacific coast including Latin America.

Fisheries of the Pacific Coast States, 1933—Continued

CATCH: BY STATES—Continued

Species	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
FISH—continued				
Pompano	4,589	$1,326	4,589	$1,326
Rockbass	348,392	15,432	348,392	15,432
Rockfishes	4,787,610	153,219	5,137,940	163,745
Rudderfish	13,152	547	13,152	547
Sablefish	1,332,573	31,779	2,716,113	74,284
Salmon:				
Blueback, red or sockeye			9,866,413	874,251
Chinook or king	4,569,808	255,701	35,114,146	2,105,290
Chum or keta			8,070,892	180,891
Humpback or pink			38,599,180	907,071
Silver or coho			15,041,308	600,504
Sculpin	68,425	3,806	68,425	3,806
Sea bass:				
Black	449,294	18,054	449,294	18,054
White	1,163,092	68,500	1,163,092	68,500
Shad	1,157,489	27,853	1,605,762	35,652
Sheepshead	58,609	1,616	58,609	1,616
Skates	193,711	2,196	193,711	2,196
Smelt	729,702	27,443	2,560,669	64,397
Spanish mackerel	4,197	191	4,197	191
Splittail	17,509	199	17,509	199
Squawfish	727	25	727	25
Steelhead trout			2,702,235	142,012
Striped bass	485,926	26,764	509,947	27,802
Sturgeon			90,963	2,155
Suckers	14,187	147	14,187	147
Swordfish	850,699	71,078	850,699	71,078
Tai	138	4	138	4
Tomcod	729	15	729	15
Tuna and tunalike fishes:				
Albacore	487	53	2,467	172
Bluefin	560,492	29,352	560,492	29,352
Bonito	2,252,199	40,232	2,252,199	40,232
Skipjack or striped tuna	16,687,308	613,091	16,687,308	613,091
Yellowfin	51,075,630	2,274,831	51,075,630	2,274,831
Whitebait	95,751	3,197	95,751	3,197
Whitefish	95,053	4,430	95,053	4,430
Yellowtail	3,898,888	87,636	3,898,888	87,636
Other fish	144,383	2,110	151,476	2,251
Total	694,598,850	6,430,698	840,523,059	12,792,968
SHELLFISH, ETC.				
Crabs	3,223,312	252,934	6,175,776	355,640
Crawfish			99,000	9,900
Sea crawfish or spiny lobster	1,049,905	144,545	1,049,905	144,545
Shrimp	2,088,750	31,498	2,141,617	35,727
Abalone	551,268	80,433	551,268	80,433
Clams:				
Hard	21,040	5,321	576,107	30,499
Pismo	26,472	5,768	26,472	5,768
Razor			586,618	83,803
Soft	62,834	13,390	62,834	13,390
Mixed			15,965	950
Mussels, sea	47	23	47	23
Octopus	31,521	2,145	55,634	3,253
Oysters:				
Eastern, market	58,419	21,907	59,885	22,751
Japanese, market	26,824	6,706	2,842,774	187,364
Native, market	1,218	558	225,736	120,222
Scallops			10,185	2,425
Squid	824,543	13,939	824,543	13,939
Turtles	2,901	125	2,901	125
Total	7,969,054	579,292	15,307,267	1,110,757
WHALE PRODUCTS				
Whale meat	2,214,000	43,242	2,214,000	43,242
Whale oil	2,116,890	41,025	2,116,890	41,025
Total	4,330,890	84,267	4,330,890	84,267
Grand total	706,898,794	7,094,257	860,161,216	13,987,992

Industries related to the fisheries of the Pacific Coast States, 1933

OPERATING UNITS, SALARIES, AND WAGES

Item	Washington	Oregon	California	Total
Transporting:	*Number*	*Number*	*Number*	*Number*
Persons engaged	179	48	18	245
Vessels, motor	74	26	4	104
Net tonnage	1,763	320	245	2,328
Wholesale and manufacturing:				
Establishments	111	57	145	313
Persons engaged:				
Proprietors	105	53	189	347
Salaried employees	205	72	470	747
Wage earners:				
Average for season	3,016	866	7,017	10,899
Average for year	865	391	2,411	3,667
Paid to salaried employees	$540,577	$192,345	$2,277,735	$3,010,657
Paid to wage earners	$348,157	$456,628	$2,280,050	$3,084,835
Total salaries and wages	$888,734	$648,973	$4,557,785	$6,095,492
Fishermen manufacturing	38	----------	130	168

PRODUCTS MANUFACTURED

Item	Washington		Oregon		California	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing firms:						
Barracuda, fresh fillets ...... pounds	----------	----------	----------	----------	50,000	$6,000
Cabrilla, fresh fillets ...... do	----------	----------	----------	----------	18,000	2,700
Cod, salted:						
Dry ...... do	315,980	$17,846	----------	----------	(1)	(1)
Boneless, including absolutely boneless ...... pounds	1,651,013	119,347	----------	----------	(1)	(1)
Flounders, fresh fillets ...... do	126,392	15,552	15,300	$1,800	1,779,000	252,750
Herring, smoked:						
Bloaters ...... do	121,620	12,971	----------	----------	----------	----------
Other smoked and kippered pounds	6,850	484	----------	----------	----------	----------
Lingcod, fresh fillets ...... do	(1)	(1)	8,240	824	130,000	18,200
Mackerel:						
Canned ...... standard cases	----------	----------	----------	----------	747,542	1,858,630
Meal ...... tons	----------	----------	----------	----------	1,278	35,554
Oil ...... gallons	----------	----------	----------	----------	83,778	10,302
Pilchard:						
Salted ...... pounds	----------	----------	----------	----------	73,400	4,454
Canned, "sardines" standard cases	----------	----------	----------	----------	1,539,446	3,805,168
Meal ...... tons	----------	----------	----------	----------	50,581	1,530,218
Flour ...... pounds	----------	----------	----------	----------	384	11,334
Oil ...... gallons	----------	----------	----------	----------	10,263,776	1,593,088
Rockfishes, fresh fillets ...... pounds	----------	----------	----------	----------	880,000	131,750
Sablefish:						
Fresh fillets ...... do	(1)	(1)	----------	----------	103,000	11,760
Salted ...... do	143,300	8,955	----------	----------	----------	----------
Kippered ...... do	183,072	22,138	----------	----------	----------	----------
Salmon:						
Mild-cured [2] ...... do	3,062,271	530,038	2,486,800	524,154	1,022,175	214,656
Kippered ...... do	1,018,687	145,732	(1)	(1)	----------	----------
Smoked ...... do	45,904	8,591	(1)	(1)	220,233	78,966
Canned:						
Chinook or king standard cases	74,567	677,206	204,320	2,052,119	(1)	(1)
Blueback, red or sockeye standard cases	134,080	1,658,053	6,503	88,009	----------	----------
Silver or coho ...... do	46,825	294,031	33,917	243,026	----------	----------
Humpback or pink ...... do	540,172	2,361,942	----------	----------	----------	----------
Chum or keta ...... do	49,779	197,217	27,000	102,136	----------	----------
Steelhead trout ...... do	3,481	28,905	14,069	132,321	----------	----------
Eggs for bait ...... do	8,537	75,281	649	17,864	----------	----------
Meal ...... tons	990	29,698	(1)	(1)	----------	----------
Oil ...... gallons	116,401	14,513	35,700	9,500	----------	----------
Sea bass:						
Black, fresh fillets ...... pounds	----------	----------	----------	----------	260,000	28,600
White, fresh fillets ...... do	----------	----------	----------	----------	85,000	16,000
Shad:						
Canned ...... standard cases	----------	----------	1,148	3,837	----------	----------
Roe, canned ...... do	(1)	(1)	321	7,259	711	15,787
Sheepshead, fresh fillets ...... pounds	----------	----------	----------	----------	15,500	1,920

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[1] The production of this item is included under "Unclassified products."

[2] This item is usually an intermediate product and, although included in the total, may be shown in its final stage of processing in this or another State.

Industries related to the fisheries of the Pacific Coast States, 1933—Continued

PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing firms—Continued:						
Tuna and tunalike fishes:						
Canned:						
Albacore standard cases	----	----	(1)	(1)	54,087	$286,236
Bluefin do	----	----	----	----	4,179	21,519
Bonito do	----	----	----	----	42,439	170,178
Striped do	----	----	----	----	225,461	1,022,819
"Tonno" do	----	----	----	----	136,740	852,236
Yellowfin do	----	----	----	----	936,299	4,417,676
Yellowtail do	----	----	----	----	43,918	163,756
Meal tons	----	----	----	----	6,004	153,300
Crabs, meat, packaged, fresh-cooked pounds	----	----	197,033	$55,575	----	----
Shrimp, meal tons	----	----	----	----	115	4,605
Abalone steaks pounds	----	----	----	----	531,698	143,262
Clams, hard:						
Fresh-shucked gallons	2,513	$2,681	----	----	----	----
Canned:						
Whole standard cases	28,986	56,173	----	----	----	----
Minced do	7,050	28,619	----	----	----	----
Chowder, juice and cocktail standard cases	4,071	9,890	----	----	----	----
Clams, razor, canned:						
Minced do	26,767	246,042	1,165	10,095	----	----
Whole and juice do	1,454	12,561	111	883	----	----
Clam shells, crushed for poultry feed tons	1,630	15,340	----	----	----	----
Oysters:						
Japanese:						
Fresh-shucked gallons	100,949	116,776	47,335	43,385	(1)	(1)
Canned standard cases	30,500	149,190	----	----	----	----
Eastern and native, fresh-shucked gallons	19,607	102,522	6,843	36,762	6,625	26,600
Oyster-shell products:						
Poultry feed tons	(1)	(1)	----	----	16,743	92,682
Lime do	----	----	----	----	3,815	12,688
Unclassified:						
Packaged pounds	[3] 158,842	[3] 35,956	----	(4)	[5] 1,057,125	[5] 175,900
Salted do	----	(4)	----	----	[6] 1,226,361	[6] 141,350
Smoked do	----	----	[7] 23,440	[7] 4,759	[8] 194,350	[8] 39,526
Canned, cat and dog food standard cases	----	----	----	----	208,780	576,596
Canned, other do	[9] 477	[9] 6,183	[10] 736	[10] 17,374	[11] 5,063	[11] 40,960
Meal and scrap tons	----	(4)	----	(4)	[12] 1,419	[12] 24,410
Oil gallons	----	----	----	----	[13] 273,650	[13] 41,325
Miscellaneous	----	[14] 19,559	----	[15] 6,992	----	[16] 358,058
Total	----	7,019,992	----	3,358,674	----	18,393,519
By fishermen:						
Cod, green-salted [2] pounds	3,255,428	106,423	----	----	1,715,726	48,270
Cod, tongues do	----	----	----	----	18,000	1,400
Shrimp:						
Dried do	----	----	----	----	115,684	16,196
Meal tons	----	----	----	----	114	2,280
Total	3,255,428	106,423	----	----	1,849,524	68,146
Grand total	----	7,126,415	----	3,358,674	----	18,461,665

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[1] The production of this item is included under "Unclassified products."

[2] This item is usually an intermediate product and, although included in the total, may be shown in its final stage of processing in this or another State.

[3] Includes fresh fillets of halibut, lingcod, and sablefish; packaged fresh-cooked crab meat; and fresh-shucked scallops.

[4] This has been included under "Miscellaneous."

[5] Includes fresh fillets of grayfish and totuava; swordfish steaks; fresh-cooked shrimp meats; and fresh-shucked Japanese oysters.

[6] Includes salted anchovies, barracuda, bonito, mackerel, sea bass, black and white, and yellowtail; mild-cured shad; and dry and boneless salt cod.

[7] Includes smoked salmon, shad, and salmon and shad wieners; and kippered sablefish, salmon, and sturgeon.

[8] Includes smoked chubs, mackerel, and sablefish, and kippered sablefish.

[9] Includes canned shad roe, sea cucumbers, and fish balls and loaf.

[10] Includes canned crabs, smoked lingcod, kippered steelhead trout, kippered Chinook salmon cheeks, smoked sturgeon, and tuna

[11] Includes canned anchovies, mackerel stew, salmon, and squid.

[12] Includes miscellaneous meal and scrap.

[13] Includes whale, sperm, and miscellaneous oil.

[14] Includes salted salmon, spiced herring, salmon-egg meal, and crushed oyster shell for poultry feed.

[15] Includes fresh fillets of rockfishes, salmon mea , and marine-shell novelties.

[16] Includes dried shrimp, concentrated powdered fish meat, marine-shell novelties, liquid glue, agar agar, and kelp products

NOTE.—The total value of manufactured products in the Pacific Coast States was as follows: By manufacturing establishments, $28,772,185; and by fishermen, $174,569. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. All of the persons engaged in the preparation of fishermen's manufactured products have also been included as fishermen.

WASHINGTON

Fisheries of Washington, 1933

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					74,240	$2,227
Cod [1]	10,501,381	$106,423				
Flounders:						
"Sole"	535,038	14,981			966	22
Other	62,027	1,230				
Halibut	23,704,547	1,523,874	1,950	$98	58,664	3,377
Herring	582,329	5,823				
"Lingcod"	655,131	18,191	4,726	71	9,787	144
Perch	20,178	732				
Rockfishes	293,811	9,540	1,340	20	6,470	107
Sablefish	1,358,345	41,863			1,379	35
Salmon:						
Blueback, red or sockeye	8,989,856	809,073	444,272	28,433	327,436	27,832
Chinook or king	7,262,126	461,355	1,943,545	99,781	8,215,244	494,153
Chum or keta	5,139,810	143,914	1,100,919	13,761	655,830	8,588
Humpback or pink	38,589,383	906,784	5,130	103		
Silver or coho	6,964,821	294,171	2,358,026	86,482	786,368	30,711
Shad					87,529	1,751
Smelt	170,713	10,243	60,700	2,125	1,054,235	12,631
Steelhead trout	42,408	2,969	81,640	3,266	1,221,765	62,397
Sturgeon	319	16			38,915	855
Other fish	7,093	141				
Total	104,879,316	4,351,323	6,002,248	234,140	12,538,829	644,830
SHELLFISH						
Crabs	410,564	16,796	703,860	29,914		
Shrimp	52,867	4,229				
Clams:						
Hard:						
Butter	239,031	9,903				
Little neck	316,036	15,275				
Razor			540,271	77,182		
Octopus	24,113	1,108				
Oysters:						
Eastern, market			1,466	844		
Japanese, market	1,165,101	63,732	1,625,649	115,126		
Native, market	212,458	114,231	7,510	2,833		
Scallops	10,185	2,425				
Total	2,430,355	227,699	2,878,756	225,899		
Grand total	107,309,671	4,579,022	8,881,004	460,039	12,538,829	644,830

[1] The catch of cod were taken off Alaska.

Fisheries of the Puget Sound district of Washington, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines	Haul seines	Gill nets		Lines		Pound nets	Brush weirs	Dip nets
			Drift, salmon	Set, salmon	Trawl, set, and hand	Troll			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	1,869	13			1,106	176	15		
On boats and shore	25	169	315	4	45	296	198	8	7
Total	1,894	182	315	4	1,151	472	213	8	7
Vessels:									
Steam							1		
Net tonnage							42		
Motor	236	4			149	100	4		
Net tonnage	5,565	35			4,144	815	119		
Sail					3				
Net tonnage					1,349				
Total vessels	236	4			152	100	5		
Total net tonnage	5,565	35			5,493	815	161		
Boats:									
Motor	5	36	296	4	86	216	15		3
Other		23	8		163		102	4	4
Apparatus:									
Number	241	59	304	4	25,215	1,580	88	4	7
Length, yards	144,118	5,216							
Square yards			398,488	1,080					
Hooks					521,129	7,118			

Fisheries of the Puget Sound district of Washington, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Drag bag nets	Reef nets	Beam trawls	Otter trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels			24	35		2		3, 112
On boats and shore	83	33	8	2	100	256	346	1, 787
Total	83	33	32	37	100	258	346	4, 899
Vessels:								
Steam			2					3
Net tonnage			33					75
Motor			6	15		1		484
Net tonnage			59	232		8		10, 421
Sail								3
Net tonnage								1, 349
Total vessels			8	15		1		490
Total net tonnage			92	232		8		11, 845
Boats:								
Motor	25	8	6	1	96	32		793
Other	8	16			4	114		444
Apparatus:								
Number	29	8	14	16	2, 800	83	346	
Length, yards	2, 382							
Yards at mouth			66	187				

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"			708	$20				
Other			467	7				
Herring			92, 900	929				
"Lingcod"			910	23			5, 345	$134
Perch			12, 726	509				
Rockfishes			2, 374	68			305	9
Salmon:								
Blueback, red or sockeye	3, 511, 600	$316, 044	27, 428	2, 469	63. 383	$5, 704	2, 973	268
Chinook or king	613, 910	27, 626	10, 626	616	550, 456	31, 926		
Chum or keta	4, 267, 690	119, 495	2, 440	68	192, 990	5, 404		
Humpback or pink	28, 803, 522	676, 883	35, 442	833	160, 832	3, 780	448	11
Silver or coho	3, 199, 328	111, 976	5. 776	277	338, 296	16, 238	24	1
Smelt			112, 692	6, 762				
Steelhead trout	1, 080	76						
Total	40, 397, 130	1, 252, 100	304, 489	12, 581	1, 305, 957	63, 052	9, 095	423
SHELLFISH								
Shrimp			49	4				
Octopus			95	4				
Total			144	8				
Grand total	40, 397, 130	1, 252, 100	304, 633	12, 589	1, 305, 957	63, 052	9, 095	423

Fisheries of the Puget Sound district of Washington, 1933—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Brush weirs	
	Trawl, set, and hand [1]		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod [2]	10, 501, 381	$106, 423						
Flounders:								
"Sole"	1, 727	48						
Other	1, 500	22			126	$2		
Halibut	23, 682, 511	1, 522, 759	20, 706	$1, 035	500	30		
Herring							467, 200	$4, 672
"Lingcod"	566, 314	16, 080	11, 017	165	311	8		
Perch	631	19						
Rockfishes	240, 343	8, 040	3, 427	51				
Sablefish	1, 358, 295	41, 861						
Salmon:								
Blueback, red or sockeye					5, 366, 054	482, 945		
Chinook or king			2, 498, 758	177, 412	3, 584, 328	223, 551		
Chum or keta					674, 080	18, 874		
Humpback or pink			19, 400	388	9, 424, 212	221, 469		
Silver or coho			1, 451, 605	71, 129	1, 958, 040	93, 986		
Steelhead trout					41, 328	2, 893		
Sturgeon					319	16		
Other fish					71	1		
Total	36, 352, 702	1, 695, 252	4, 004, 913	250, 180	21, 049, 369	1, 043, 775	467, 200	4, 672
SHELLFISH								
Octopus	22, 179	1, 020						
Grand total	36, 374, 881	1, 696, 272	4, 004, 913	250, 180	21, 049, 369	1, 043, 775	467, 200	4, 672

Species	Dip nets		Drag bag nets		Reef nets		Beam trawls [3]	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Herring	1, 829	$18	20, 400	$204				
Perch			6, 414	192				
Rockfishes			132	2				
Salmon:								
Blueback, red or sockeye			1, 410	112	17, 008	$1, 531		
Chinook or king			3, 630	200	418	24		
Chum or keta					2, 610	73		
Humpback or pink					145, 527	3, 420		
Silver or coho					11, 752	564		
Smelt			58, 021	3, 481				
Total	1, 829	18	90, 007	4, 191	177, 315	5, 612		
SHELLFISH								
Shrimp							52, 818	$4, 225
Octopus			1, 580	72				
Scallops							10, 185	2, 425
Total			1, 580	72			63, 003	6, 650
Grand total	1, 829	18	91, 587	4, 263	177, 315	5, 612	63, 003	6, 650

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[1] In addition, the vessels in the Pacific coast halibut fleet landed about 485,000 pounds of halibut, sablefish, and "lingcod" livers at Seattle, which were valued at about $73,000.

[2] The cod were taken off Alaska.

[3] Does not include a small amount of sea cucumbers taken by beam trawls. The poundage of scallops is based on a yield of 15 percent meat.

Fisheries of the Puget Sound district of Washington, 1933—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Traps		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"	532,603	$14,913						
Other	59,934	1,199						
Halibut	830	50						
"Lingcod"	71,234	1,781						
Perch	407	12						
Rockfishes	47,230	1,370						
Sablefish	50	2						
Other fish	7,022	140						
Total	719,310	19,467						
SHELLFISH								
Crabs [4]			410,564	$16,796				
Clams:								
Hard: [5]								
Butter							239,031	$9,903
Little neck							316,036	15,275
Octopus	259	12						
Oysters: [6]								
Japanese, market					1,165,101	$63,732		
Native, market					212,458	114,231		
Total	259	12	410,564	16,796	1,377,559	177,963	555,067	25,178
Grand total	719,569	19,479	410,564	16,796	1,377,559	177,963	555,067	25,178

[4] The poundage of crabs is based on a weight of 22 pounds per dozen.

[5] The poundage of hard clams is based on a yield of 28 percent clam meat for butter clams and 24 percent for little neck clams.

[6] The poundage of oysters is based on a yield of 16 percent oyster meat for the native oysters and 13¼ percent meat for the Japanese oysters.

Fisheries of the coastal district of Washington, 1933

OPERATING UNITS: BY GEAR

Item	Gill nets		Lines, troll	Pound nets	Dip nets	Drag bag nets	Traps, crab	Tongs and rakes	Dredges	Shovels	Total, exclusive of duplication
	Drift, salmon	Set, salmon									
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels			17				16		8		41
On boats and shore	120	149	156	65	46	26	60	151		2,200	2,818
Total	120	149	173	65	46	26	76	151	8	2,200	2,859
Vessels, motor			10				8		2		20
Net tonnage			79				74		13		166
Boats:											
Motor	114	104	111	46			48	28			442
Other		62		34		4	7	60			164
Apparatus:											
Number	114	190	605	105	46	4	2,464	73	4	2,200	
Length, yards						260					
Square yards	207,480	52,500									
Yards at mouth									4		
Hooks			2,722								

Fisheries of the coastal district of Washington, 1933—Continued

CATCH: BY GEAR

Species	Gill nets				Lines, troll		Pound nets	
	Drift		Set					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut					1,950	$98		
"Lingcod"					4,726	71		
Rockfishes					1,340	20		
Salmon:								
Blueback, red or sockeye			444,272	$28,433				
Chinook or king	473,135	$15,140	239,131	7,652	963,794	68,429	267,485	$8,560
Chum or keta	137,388	1,717	325,752	4,072			637,779	7,972
Humpback or pink					5,130	103		
Silver or coho	388,954	12,446	522,580	16,723	787,553	36,227	658,939	21,086
Steelhead trout	1,460	58	71,890	2,876			8,290	332
Total	1,000,937	29,361	1,603,625	59,756	1,764,493	104,948	1,572,493	37,950

Species	Dip nets		Drag bag nets		Traps		Dredges, tongs, and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Smelt	15,700	$550	45,000	$1,575						
SHELLFISH										
Crabs [1]					703,860	$29,914				
Clams, razor [2]									540,271	$77,182
Oysters: [3]										
Eastern, market							1,466	$844		
Japanese, market							1,625,649	115,126		
Native, market							7,510	2,833		
Total					703,860	29,914	1,634,625	118,803	540,271	77,182
Grand total	15,700	550	45,000	1,575	703,860	29,914	1,634,625	118,803	540,271	77,182

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[1] The poundage of crabs is based on a weight of 20 pounds per dozen.

[2] The poundage of razor clams is based on a yield of 42 percent of cleaned clam meat.

[3] The poundage of oysters is based on a weight of 13 percent oyster meat for eastern oysters, 14 percent for Japanese oysters, and 14 percent for native oysters.

Fisheries of the Columbia River district of Washington, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Fish wheels	Dip nets	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				4					4
On boats and shore	326	596	65	7	6	182	20	150	1,251
Total	326	596	65	11	6	182	20	150	1,255
Vessels, motor				1					1
Net tonnage				9					9
Boats:									
Motor	20	434	50	7	4	88		78	640
Other	30		15			40		6	89
Apparatus:									
Number	31	434	134	166	18	204	29	150	
Length, yards	9,550								
Square yards		1,206,520	34,036						
Hooks				4,725	85				

Fisheries of the Columbia River district of Washington, 1933—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines	
			Drift		Set		Trawl and set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	74, 240	$2, 227						
Flounders, "sole"							966	$22
Halibut							58, 664	3, 377
"Lingcod"							9, 787	144
Rockfishes							6, 470	107
Sablefish							1, 379	35
Salmon:								
Blueback, red or sockeye	8, 911	757	24, 334	$2, 068	12, 279	$1, 044		
Chinook or king	1, 339, 380	80, 095	3, 665, 013	219, 168	81, 094	4, 622		
Chum or keta	5, 690	71	483, 122	6, 329	18, 244	239		
Silver or coho	37, 711	1, 395	249, 561	10, 107	11, 865	415		
Shad	54, 529	1, 091	26, 724	534	128	3		
Smelt			167, 100	3, 760				
Steelhead trout	236, 594	11, 830	404, 115	21, 256	17, 742	915		
Sturgeon	2, 272	32	17, 590	369	1, 073	32	3, 182	95
Total	1, 759, 327	97, 498	5, 037, 559	263, 591	142, 425	7, 270	80, 448	3, 780

Species	Lines		Pound nets		Fish wheels		Dip nets	
	Troll							
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye			31, 013	$2, 636	204, 406	$17, 375	46, 493	$3, 952
Chinook or king	27, 273	$2, 057	2, 345, 635	140, 269	478, 444	35, 692	278, 405	12, 250
Chum or keta			148, 774	1, 949				
Silver or coho	51, 376	2, 248	430, 374	16, 354	126	5	5, 355	187
Shad			1, 838	37	4, 310	86		
Smelt							887, 135	8, 871
Steelhead trout			463, 120	23, 712	65, 200	2, 934	34, 995	1, 750
Sturgeon			3, 913	76	10, 749	247	136	4
Total	78, 649	4, 305	3, 424, 667	185, 033	763, 235	56, 339	1, 252, 519	27, 014

OREGON

Fisheries of Oregon, 1933

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Carp	8, 500	$170		
Flounders:				
"Sole"	9, 455	236	24, 957	$440
Other			32, 406	433
Halibut	181, 030	10, 540	229, 412	13, 226
Herring			30, 038	302
"Lingcod"	107, 794	1, 684	105, 708	2, 227
Perch			15, 322	193
Pilchard			7, 090	71
Rockfishes	11, 961	259	36, 748	600
Sablefish	16, 181	410	7, 635	197
Salmon:				
Blueback, red or sockeye	104, 849	8, 913		
Chinook or king	11, 500, 763	699, 388	1, 622, 660	94, 912
Chum or keta	517, 884	6, 751	656, 449	7, 877
Humpback or pink	1, 626	32	3, 041	152
Silver or coho	1, 719, 855	75, 420	3, 212, 238	113, 720
Shad	127, 322	2, 547	233, 422	3, 501
Smelt	540, 968	11, 798	4, 351	157
Steelhead trout	1, 072, 819	55, 059	283, 602	18, 321
Striped bass			24, 021	1, 038

Fisheries of Oregon, 1933—Continued

CATCH: BY DISTRICTS—Continued

Species	Columbia River district		Coastal district	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*
Sturgeon	45,553	$1,105	6,176	$179
Tuna, albacore			1,980	119
Total	15,966,560	874,312	6,537,256	257,665
SHELLFISH				
Crabs			1,838,040	55,996
Crawfish	99,000	9,900		
Clams:				
Razor			46,347	6,621
Mixed			15,965	950
Oysters:				
Japanese, market			25,200	1,800
Native, market			4,550	2,000
Total	99,000	9,900	1,930,102	67,967
Grand total	16,065,560	884,212	8,467,358	325,632

Fisheries of the Columbia River district of Oregon, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Traps, crawfish	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
Fisherman:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				8	34				42
On boats and shore	430	1,176	52	37	160	38	140	25	2,011
Total	430	1,176	52	45	194	38	140	25	2,053
Vessels, motor				2	19				21
Net tonnage				34	179				213
Boats:									
Motor	18	823	46	35	132	20	5	21	1,079
Other	32		6	2		9		4	51
Apparatus:									
Number	32	823	122	342	755	35	140	1,500	
Length, yards	15,135								
Square yards		2,588,335	32,330						
Hooks				10,450	3,397				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines	
			Drift		Set		Trawl and set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	8,500	$170						
Flounders, "sole"							9,455	$236
Halibut							171,771	10,108
"Lingcod"							47,157	981
Rockfishes							11,961	259
Sablefish							16,181	410
Salmon:								
Blueback, red or sockeye	10,012	851	46,185	$3,926	27,224	$2,314		
Chinook or king	974,608	58,282	8,351,281	499,407	87,452	4,985		
Chum or keta	55,296	691	422,102	5,530	966	13		
Silver or coho	69,284	2,563	272,597	11,040	4,180	146		
Shad	11,477	230	114,309	2,286	460	9		
Smelt			511,054	11,499				
Steelhead trout	349,820	17,491	565,846	29,537	15,695	800		
Sturgeon	441	12	32,612	725	2,410	72	8,008	240
Total	1,479,438	80,290	10,315,986	563,950	138,387	8,339	264,533	12,234

Fisheries of the Columbia River district of Oregon, 1933—Continued

CATCH: BY GEAR—Continued

Species	Lines		Pound nets		Dip nets		Traps	
	Troll							
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut	9,259	$432						
"Lingcod"	60,637	703						
Salmon:								
Blueback, red or sockeye			10,277	$874	11,151	$948		
Chinook or king	1,329,163	98,491	307,559	18,392	450,700	19,831		
Chum or keta			38,272	501	1,248	16		
Humpback or pink	1,626	32						
Silver or coho	1,247,312	56,628	123,209	4,928	3,273	115		
Shad			1,076	22				
Smelt					29,914	299		
Steelhead trout	160	8	121,298	6,223	20,000	1,000		
Sturgeon			333	9	1,749	47		
Total	2,648,157	156,294	602,024	30,949	518,035	22,256		
SHELLFISH								
Crawfish							99,000	$9,900
Grand total	2,648,157	156,294	602,024	30,949	518,035	22,256	99,000	9,900

Fisheries of the coastal district of Oregon, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Otter trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				20	10	7				33
On boats and shore	5	631	374	18	130		278	8	171	1,416
Total	5	631	374	38	140	7	278	8	171	1,449
Vessels, motor				5	6	2				12
Net tonnage				66	46	24				120
Boats:										
Motor	2	485	215	12	97		250	2		943
Other	2		132				28	2		156
Apparatus:										
Number	2	485	750	915	515	2	8,340	8	171	
Length, yards	317									
Square yards		638,260	114,000							
Yards at mouth						40				
Hooks				19,775	2,317					

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"					12,386	$248	188	$3
Other	3,417	$51	5,063	$75	5,969	96		
Halibut					213,733	12,407	5,122	291
Herring	16,732	167	13,306	135				
"Lingcod"					52,780	1,148	27,459	538
Perch	9,142	138	6,180	55				
Pilchard	7,090	71						
Rockfishes			830	12	31,637	514	1,914	31
Sablefish					7,210	184		
Salmon:								
Chinook or king			1,243,962	65,184			378,698	29,728
Chum or keta			656,449	7,877				
Humpback or pink							3,041	152
Silver or coho			2,099,736	66,772			1,112,502	46,948
Shad			233,422	3,501				
Smelt	81	3	4,270	154				
Steelhead trout			283,602	18,321				
Striped bass			24,021	1,038				
Sturgeon			5,910	168				
Tuna, albacore							1,980	119
Total	36,462	430	4,576,751	163,292	323,715	14,597	1,530,904	77,810

Fisheries of the coastal district of Oregon, 1933—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Traps		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"	12,383	$189						
Other	17,957	211						
Halibut	10,557	528						
"Lingcod"	25,469	541						
Rockfishes	2,367	43						
Sablefish	425	13						
Sturgeon	266	11						
Total	69,424	1,536						
SHELLFISH								
Crabs	880	46	1,837,160	$55,950				
Clams:								
Razor [1]							46,347	$6,621
Mixed [2]							15,965	950
Oysters:								
Japanese, market					25,200	$1,800		
Native, market					4,550	2,600		
Total	880	46	1,837,160	55,950	29,750	4,400	62,312	7,571
Grand total	70,304	1,582	1,837,160	55,950	29,750	4,400	62,312	7,571

[1] Razor clam poundage is the weight of the steam shucked cleaned meat, which is 42 percent of the round weight.

[2] Mixed clams consist principally of eastern soft-shelled clams. The weight shown is the fresh-shucked weight which is 21 percent of the round weight.

CALIFORNIA

Fisheries of California, 1933

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district		Monterey district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	70	$2	185,095	$2,134	90,758	$1,161
Barracuda					29	3
Carp			57,856	610		
Catfish			172,463	19,849		
Cod [1]			5,534,600	49,670		
Flounders:						
"California halibut"			23,812	2,005	22,065	1,574
"Sole"	3,091,061	128,462	3,973,339	163,847	569,440	21,572
Other	446,594	16,723	532,307	21,947	81,997	2,689
Grayfish	3,360	17	86,456	432	6,470	34
Hake	3,440	34	25,991	260	2,642	27
Halibut	321,664	16,459				
Hardhead			156,687	7,684		
Herring			544,995	2,725	51,595	236
Horse mackerel					33,479	1,682
Kingfish			13,442	538	189,285	5,308
"Lingcod"	491,493	14,432	396,368	13,858	188,827	6,798
Mackerel			218	6	1,352,754	19,789
Perch	4,261	106	110,675	4,376	55,399	1,539
Pilchard or sardine			62,214,480	195,674	254,311,594	784,486
Pompano			59	27	95	43
Rock bass			5	1	10	1
Rockfishes	486,384	18,590	654,513	22,417	1,644,126	45,674
Sablefish	483,089	12,095	121,857	3,047	238,515	3,516
Salmon	3,356,047	185,769	643,854	34,023	569,859	35,902
Sculpin			1,961	40	2,070	21
Sea bass:						
Black					30	1
White			1,306	146	5,514	409
Shad			1,157,484	27,852	5	1
Skates	5,623	56	138,222	1,382	25,642	337
Smelt	32,630	1,007	316,089	12,676	117,054	4,907
Splittail			17,509	199		

[1] The catch of cod was taken off Alaska.

NOTE.—The catch of pilchard by floating reduction plants off the coast of California is not included.

Fisheries of California, 1933—Continued

CATCH: BY DISTRICTS—Continued

Species	Northern district		San Francisco district		Monterey district	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued						
Squawfish			727	$25		
Striped bass			485,926	26,764		
Suckers			14,187	147		
Tomcod	438	$9	291	6		
Tuna and tunalike fishes:						
Albacore					407	$43
Bonito					10	1
Whitebait	49,460	1,736	44,682	1,372	1,609	89
Other fish	91,663	1,208	34,682	374	11,017	244
Total	8,867,277	396,705	77,662,138	616,113	259,572,297	938,087
SHELLFISH						
Crabs	126,904	7,728	2,893,546	236,457	188,044	8,067
Shrimp			2,087,952	31,320	798	178
Abalone					444,300	69,732
Clams:						
Hard	113	14	16,522	4,245		
Pismo					6,524	1,398
Soft	6,557	646	56,277	12,744		
Octopus	337	25	8,590	602	22,535	1,512
Oysters, market:						
Eastern			58,419	21,907		
Japanese					26,824	6,706
Native			1,218	558		
Squid					769,695	13,007
Total	133,911	8,413	5,122,524	307,833	1,458,720	100,600
WHALE PRODUCTS						
Whale meat			2,214,000	43,242		
Whale oil			2,116,890	41,025		
Total			4,330,890	84,267		
Grand total	9,001,188	405,118	87,115,552	1,008,213	261,031,017	1,038,687

Species	San Pedro district					
	Off California		Off Latin America		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Anchovies	41,369	$558			41,369	$558
Barracuda	2,433,934	93,661	126,263	$10,925	2,560,197	104,586
Cabrilla			8,275	233	8,275	233
Flounders:						
"California halibut"	780,521	48,722	91	8	780,612	48,730
"Sole"	669,214	18,514			669,214	18,514
Other	13,812	1,819			13,812	1,819
Flyingfish	16,396	501			16,396	501
Grayfish	318,394	7,880	61	2	318,455	7,882
Hake	5,466	40			5,466	40
Herring	190	8			190	8
Horse mackerel	976,771	10,233			976,771	10,233
Kingfish	359,896	6,273			359,896	6,273
"Lingcod"	12,267	272			12,267	272
Mackerel	58,922,597	344,828			58,922,597	344,828
Marlin	6,253	257			6,253	257
Mullet	1,374	68	423	17	1,797	85
Perch	44,218	2,476	112	11	44,330	2,487
Pilchard or sardine	192,738,816	521,607			192,738,816	521,607
Pompano	3,693	1,190			3,693	1,190
Rock bass	200,868	9,479	12,992	829	213,860	10,308
Rockfishes	1,401,711	46,729	7,099	218	1,408,810	46,947
Rudderfish	12,813	537			12,813	537
Sablefish	487,508	13,093			487,508	13,093
Salmon	48	7			48	7
Sculpin	56,356	3,393			56,356	3,393
Sea bass:						
Black	46,047	2,128	172,116	7,798	218,163	9,926
White	632,539	37,353	39,390	2,528	671,929	39,881
Sheepshead	50,924	1,393			50,924	1,393
Skates	23,524	413			23,524	413
Smelt	240,943	8,104			240,943	8,104
Spanish mackerel			3,012	145	3,012	145
Swordfish	575,849	50,549			575,849	50,549
Tai			138	4	138	4

NOTE.—The catch of pilchard by floating reduction plants off the coast of California is not included.

Fisheries of California, 1933—Continued

CATCH: BY DISTRICTS—Continued

Species	San Pedro district					
	Off California		Off Latin America		Total	
FISH—continued						
Tuna and tunalike fishes:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	80	$10			80	$10
Bluefin	316, 914	18, 429	236, 276	$10, 504	553, 190	28, 933
Bonito	919, 999	12, 981	186, 819	4, 440	1, 106, 818	17, 421
Skipjack or striped tuna	10	1	5, 375, 294	193, 248	5, 375, 304	193, 249
Yellowfin			16, 029, 485	708, 092	16, 029, 485	708, 092
Whitefish	39, 120	2, 147	5, 228	263	44, 348	2, 410
Yellowtail	245, 890	8, 766	430, 875	14, 018	676, 765	22, 784
Other fish	5, 992	235			5, 992	235
Total	262, 602 316	1, 274, 654	22, 633, 949	953, 283	285, 236, 265	2, 227, 937
SHELLFISH						
Crabs	14, 818	682			14, 818	682
Sea crawfish or spiny lobster	306, 687	42, 775	21, 298	3, 731	327, 985	46, 506
Abalone	106, 968	10, 701			106, 968	10, 701
Clams:						
Hard	4, 405	1, 062			4, 405	1, 062
Pismo	19, 948	4, 370			19, 948	4, 370
Mussels	47	23			47	23
Octopus	59	6			59	6
Squid	54, 848	932			54, 848	932
Total	507, 780	60, 551	21, 298	3, 731	529, 078	64, 282
Grand total	263, 110, 096	1, 335, 205	22, 655, 247	957, 014	285, 765, 343	2, 292, 219

Species	San Diego district					
	Off California		Off Latin America		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	478, 189	$15, 506	34, 547	$2, 506	512, 736	$18, 012
Cabrilla			76, 337	2, 573	76, 337	2, 573
Corbina			290	23	290	23
Flounders:						
"California halibut"	78, 431	5, 435	84, 305	5, 584	162, 736	11, 019
"Sole"	3, 916	331			3, 916	331
Other	22	1			22	1
Grayfish	56, 289	320			56, 289	320
Herring	4, 665	62			4, 665	62
Horse mackerel	600	6			600	6
Kingfish	1, 643	34			1, 643	34
Mackerel	9, 338, 361	55, 504	969	21	9, 339, 330	55, 525
Marlin	606	24			606	24
Mullet	19, 827	800	2, 390	116	22, 217	916
Perch	349	14			349	14
Pilchard or sardine	532, 591	3, 350			532, 591	3, 350
Pompano	32	10	710	56	742	66
Rock bass	129, 871	4, 883	4, 646	239	134, 517	5, 122
Rockfishes	556, 964	18, 174	36, 813	1, 417	593, 777	19, 591
Rudderfish	339	10			339	10
Sablefish	1, 604	28			1, 604	28
Sculpin	8, 038	352			8, 038	352
Sea bass:						
Black	73, 505	2, 611	157, 596	5, 516	231, 101	8, 127
White	188, 783	8, 518	295, 560	19, 546	484, 343	28, 064
Sheepshead	7, 685	223			7, 685	223
Skates	700	8			700	8
Smelt	22, 726	736	260	13	22, 986	749
Spanish mackerel			1, 185	46	1, 185	46
Swordfish	234, 787	17, 685	40, 063	2, 844	274, 850	20, 529
Tuna and tunalike fishes:						
Bluefin	7, 302	419			7, 302	419
Bonito	1, 047, 235	20, 854	98, 136	1, 956	1, 145, 371	22, 810
Skipjack or striped tuna			11, 312, 004	419, 842	11, 312, 004	419, 842
Yellowfin	6, 867	431	35, 039, 278	1, 566, 308	35, 046, 145	1, 566, 739
Whitefish	42, 108	1, 673	8, 597	347	50, 705	2, 020
Yellowtail	987, 396	22, 517	2, 234, 727	42, 335	3, 222, 123	64, 852
Other fish	300	12	729	37	1, 029	49
Total	13, 831, 731	180, 531	49, 429, 142	2, 071, 325	63, 260, 873	2, 251, 856
SHELLFISH						
Sea crawfish or spiny lobster	73, 788	10, 578	648, 132	87, 461	721, 920	98, 039
Turtles			2, 901	125	2, 901	125
Total	73, 788	10, 578	651, 033	87, 586	724, 821	98, 164
Grand total	13, 905, 519	191, 109	50, 080, 175	2, 158, 911	63, 985, 694	2, 350, 020

Fisheries of California, 1933—Continued

CATCH: BY WATERS

Species	Off California [1]		Off Latin America	
	Pounds	*Value*	*Pounds*	*Value*
FISH				
Anchovies	317, 292	$3, 855		
Barracuda	2, 912, 152	109, 170	160, 810	$13, 431
Cabrilla			84, 612	2, 806
Carp	57, 856	610		
Catfish	172, 463	19, 849		
Cod [1]	5, 534, 600	49, 670		
Corbina			290	23
Flounders:				
"California halibut"	904, 829	57, 736	84, 396	5, 592
"Sole"	8, 306, 970	332, 726		
Other	1, 074, 732	43, 179		
Flyingfish	16, 396	501		
Grayfish	470, 969	8, 683	61	2
Hake	37, 539	361		
Halibut	321, 664	16, 459		
Hardhead	156, 687	7, 684		
Herring	601, 445	3, 031		
Horse mackerel	1, 010, 850	11, 921		
Kingfish	564, 266	12, 153		
"Lingcod"	1, 088, 955	35, 360		
Mackerel	69, 613, 930	420, 127	969	21
Marlin	6, 859	281		
Mullet	21, 201	868	2, 813	133
Perch	214, 902	8, 511	112	11
Pilchard or sardine	509, 797, 481	1, 505, 117		
Pompano	3, 879	1, 270	710	56
Rock bass	330, 754	14, 364	17, 638	1, 068
Rockfishes	4, 743, 698	151, 584	43, 912	1, 635
Rudderfish	13, 152	547		
Sablefish	1, 332, 573	31, 779		
Salmon	4, 569, 808	255, 701		
Sculpin	68, 425	3, 806		
Sea bass:				
Black	119, 582	4, 740	329, 712	13, 314
White	828, 142	46, 426	334, 950	22, 074
Shad	1, 157, 489	27, 853		
Sheepshead	58, 609	1, 616		
Skates	193, 711	2, 196		
Smelt	729, 442	27, 430	260	13
Spanish mackerel			4, 197	191
Splittail	17, 509	199		
Squawfish	727	25		
Striped bass	485, 926	26, 764		
Suckers	14, 187	147		
Swordfish	810, 636	68, 234	40, 063	2, 844
Tai			138	4
Tomcod	729	15		
Tuna and tunalike fish:				
Albacore	487	53		
Bluefin	324, 216	18, 848	236, 276	10, 504
Bonito	1, 967, 244	33, 836	284, 955	6, 396
Skipjack or striped tuna	10	1	16, 687, 298	613, 090
Yellowfin	6, 867	431	51, 068, 763	2, 274, 400
Whitebait	95, 751	3, 197		
Whitefish	81, 228	3, 820	13, 825	610
Yellowtail	1, 233, 286	31, 283	2, 665, 602	56, 353
Other fish	143, 654	2, 073	729	37
Total	622, 535, 759	3, 406, 090	72, 063, 091	3, 024, 608
SHELLFISH				
Crabs	3, 223, 312	252, 934		
Sea crawfish or spiny lobster	380, 475	53, 353	669, 430	91, 192
Shrimp	2, 088, 750	31, 498		
Abalone	551, 268	80, 433		
Clams:				
Hard	21, 040	5, 321		
Pismo	26, 472	5, 768		
Soft	62, 834	13, 390		
Mussels, sea	47	23		
Octopus	31, 521	2, 145		
Oysters, market:				
Eastern	58, 419	21, 907		
Japanese	26, 824	6, 706		
Native	1, 218	558		

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[1] The catch of cod was taken off Alaska.

NOTE.—The catch of pilchard by floating reduction plants off the coast of California is not included.

Fisheries of California, 1933—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
	Pounds	*Value*	*Pounds*	*Value*
SHELLFISH—continued				
Squid	824,543	$13,939		
Turtles			2,901	$125
Total	7,296,723	487,975	672,331	91,317
WHALE PRODUCTS				
Whale meat	2,214,000	43,242		
Whale oil	2,116,890	41,025		
Total	4,330,890	84,267		
Grand total	634,163,372	3,978,332	72,735,422	3,115,925

Fisheries of the northern district of California, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Dip nets	Crab traps	Shovels	Total, exclusive of duplication
		Drift, salmon	Other	Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				22	30				34
On boats and shore	21	203	18	67	230	11	21	16	455
Total	21	203	18	89	260	11	21	16	489
Vessels, motor				8	14				15
Net tonnage				78	116				132
Boats:									
Motor			15	50	202		17		202
Other	5	128							128
Apparatus:									
Number	5	128	15	265	1,056	11	324	16	
Length, yards	1,040								
Square yards		122,131	11,210						
Hooks				45,560	4,601				

NOTE—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Set and hand		Troll	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Anchovies			70	$2				
Flounders:								
"Sole"					920	$13		
Other			3,702	105				
Halibut					179,470	9,177	7,999	$420
"Lingcod"					120,829	2,265	36,022	455
Perch			4,261	106				
Rockfishes					30,608	609	511	6
Sablefish					372,114	9,321		
Salmon	18,492	$850	423,920	21,192			2,913,635	163,727
Smelt			26,065	812				
Other fish					21,272	503	383	5
Total	18,492	850	458,018	22,217	725,213	21,888	2,958,550	164,613
SHELLFISH								
Octopus					72	4		
Grand total	18,492	850	458,018	22,217	725,285	21,892	2,958,550	164,613

NOTE.—The catch of pilchard by floating reduction plants off the coast of California is not included.

Fisheries of the northern district of California, 1933—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Paranzella nets		Traps		Shovels	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Flounders:								
"Sole"			3,090,141	$128,449				
Other			442,892	16,618				
Grayfish			3,360	17				
Hake			3,440	34				
Halibut			134,195	6,862				
"Lingcod"			334,642	11,712				
Rockfishes			455,265	17,975				
Sablefish			110,975	2,774				
Skates			5,623	56				
Smelt	6,565	$195						
Tomcod			438	9				
Whitebait	49,460	1,736						
Other fish			70,008	700				
Total	56,025	1,931	4,650,979	185,206				
SHELLFISH								
Crabs			180	13	126,724	$7,715		
Clams:								
Hard							113	$14
Soft							6,557	646
Octopus			265	21				
Total			445	34	126,724	7,715	6,670	660
Grand total	56,025	1,931	4,651,424	185,240	126,724	7,715	6,670	660

NOTE.—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

Fisheries of the San Francisco district of California, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara and ring nets, sardine	Haul seines	Gill nets				Lines	
				Drift, salmon	Drift, sea bass	Drift, shad	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	103	89					3	95	31
On boats and shore		71	3	274	3	338	82	192	145
Total	103	160	3	274	3	338	85	287	176
Vessels:									
Motor	10	8					2	3	16
Net tonnage	445	98					21	36	225
Sail								2	
Net tonnage								824	
Total vessels	10	8					2	5	16
Total net tonnage	445	98					21	860	225
Boats:									
Motor		10		144	1	180	45	108	136
Other			1	8	1	8	7	47	
Apparatus:									
Number	10	18	1	152	2	188	91	1,257	992
Length, yards	3,287	6,165	165						
Square yards				464,138	1,060	627,655	127,602		
Hooks								140,349	5,066

Fisheries of the San Francisco district of California, 1933—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Bag nets, shrimp	Paranzella nets	Beam trawls	Traps, crab	Harpoons, whaling	Rakes and tongs	Shovels	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels			22	76		2	16			388
On boats and shore	69	8	24		18	246		17	91	1,004
Total	69	8	46	76	18	248	16	17	91	1,392
Vessels:										
Steam							2			2
Net tonnage							41			41
Motor			5	16		2				41
Net tonnage			31	228		21				821
Sail										2
Net tonnage										824
Total vessels			5	16		2	2			45
Total net tonnage			31	228		21	41			1,686
Boats:										
Motor	37		6		18	244		6		564
Other	19							10	5	92
Apparatus:										
Number	2,591	8	11	8	18	4,808	2	17	91	
Length, yards			7,312							
Yards at mouth				133	120					

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Haul seines	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			175,780	$1,994		
Carp					41,333	$138
Flounders:						
"California halibut"			30	2		
Other			192	4		
Hardhead					138,840	6,724
Herring			3,420	17		
Kingfish			9,865	395		
"Lingcod"			153	5		
Mackerel			218	6		
Perch			272	10		
Pilchard or sardine	35,605.615	$115,200	26,604,950	80,435		
Pompano			59	27		
Rock bass			5	1		
Rockfishes			43	2		
Sea bass, white			46	4		
Shad			175	5		
Smelt			13,986	561		
Splittail					13,645	137
Suckers					13,934	139
Tomcod			40	1		
Whitebait			26,123	784		
Total	35,605,615	115,200	26,835,357	84,253	210,752	7,438

Fisheries of the San Francisco district of California, 1933—Continued

CATCH: BY GEAR—Continued

Species	Gill nets		Lines			
			Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	9,315	$140				
Carp	8,529	116	118	$2		
Catfish	141	17	2,341	235		
Cod			5,534,600	49,670		
Flounders:						
"California halibut"			574	46	351	$28
"Sole"			7,341	294		
Other	475	10	1,280	27		
Grayfish			17,155	86		
Herring	541,575	2,708				
"Lingcod"	83	3	295,763	10,352	1,009	20
Perch	108,599	4,294	1,284	51		
Pilchard or sardine	3,915	39				
Rockfishes			362,771	12,084	184	4
Sablefish			76,190	1,905		
Salmon	450,314	22,585			193,540	11,438
Sculpin			1,961	40		
Sea bass, white	1,260	142				
Shad	1,157,309	27,847				
Smelt	299,631	11,994				
Splittail	325	4				
Squawfish	545	19	88	3		
Striped bass	426,006	20,079	59,920	6,685		
Whitebait	16,991	510				
Other fish	36	1	1,251	25	25	1
Total	3,025,049	90,508	6,362,637	81,505	195,109	11,491
SHELLFISH						
Octopus			8,568	600		
Grand total	3,025,049	90,508	6,371,205	82,105	195,109	11,491

Species	Fyke nets		Dip nets		Bag nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	4,876	$54				
Catfish	169,981	19,597				
Hardhead	17,847	960				
Smelt			2,472	$121		
Splittail	3,539	58				
Squawfish	94	3				
Suckers	253	8				
Whitebait			1,568	78		
Other fish	803	21				
Total	197,393	20,701	4,040	199		
SHELLFISH						
Shrimp					1,494,768	$22,422
Grand total	197,393	20,701	4,040	199	1,494,768	22,422

Species	Paranzella nets		Beam trawls		Traps	
FISH						
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"California halibut"	22,857	$1,929				
"Sole"	3,965,998	163,553				
Other	530,360	21,906				
Grayfish	69,301	346				
Hake	25,991	260				
Kingfish	3,577	143				
"Lingcod"	99,360	3,478				
Perch	520	21				
Rockfishes	291,515	10,327				
Sablefish	45,667	1,142				
Skates	138,222	1,382				
Tomcod	251	5				
Other fish	32,567	326				
Total	5,226,186	204,818				
SHELLFISH						
Crabs	24,366	1,991			2,869,180	$234,466
Shrimp			593,184	$8,898		
Octopus	22	2				
Total	24,388	1,993	593,184	8,898	2,869,180	234,466
Grand total	5,250,574	206,811	593,184	8,898	2,869,180	234,466

Fisheries of the San Francisco district of Cailfornia, 1933—Continued

CATCH: BY GEAR—Continued

Species	Harpoons		Rakes and tongs		Shovels	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH						
Clams:						
Hard					16,522	$4,245
Soft					56,277	12,744
Oysters, market:						
Eastern			58,419	$21,907		
Native			1,218	558		
Total			59,637	22,465	72,799	16,989
WHALE PRODUCTS						
Whale meat	2,214,000	$43,242				
Whale oil	2,116,890	41,025				
Total	4,330,890	84,267				
Grand total	4,330,890	84,267	59,637	22,465	72,799	16,989

Fisheries of the Monterey district of California, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara and ring nets		Gill nets			Lines	
		Sardine	Squid	Drift, sea bass	Set, "California halibut"	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	334	234	50			2		5
On boats and shore		136	139	8	20	79	229	195
Total	334	370	189	8	20	81	229	200
Vessels, motor	33	21	8			1		4
Net tonnage	1,293	229	67			20		46
Boats:								
Motor		12	26	4	11	39	153	182
Other						17	52	
Apparatus:								
Number	33	33	34	4	11	82	980	442
Length, yards	10,960	10,101	6,507					
Square yards				11,408	54,733	111,999		
Hooks							137,972	2,596

Item	Paranzella nets	Traps		Rakes and shovels	Abalone outfits	Total, exclusive of duplication
		Crab	Octopus			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4				56	538
On boats and shore	2	12	5	38	20	539
Total	6	12	5	38	76	1,077
Vessels, motor	1				12	60
Net tonnage	21				90	1,560
Boats:						
Motor	1	5	3	7	4	208
Other		5		14		63
Apparatus:						
Number	1	47	51	38	16	
Yards at mouth	17					

Fisheries of the Monterey district of California, 1933—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Lines—Set and hand	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			90, 643	$1, 144	115	$17		
Barracuda			5	1	24	2		
Flounders:								
"California halibut"	62	$4	343	24	18, 364	1, 312	2, 640	$188
"Sole"			135	5	6, 507	244	33, 420	1, 253
Other			865	31	13, 585	406	19, 488	687
Grayfish							2, 285	12
Hake							492	5
Herring			48, 260	203	3, 335	33		
Horse mackerel			31, 198	1, 567	549	28	1, 732	87
Kingfish	80	2	44, 581	1, 252	94, 444	2, 650	47, 867	1, 344
"Lingcod"			175	6	3, 525	127	164, 698	5, 943
Mackerel	255, 933	3, 744	790, 217	11, 559	921	14	305, 683	4, 472
Perch			18, 617	532	25, 433	714	11, 049	277
Pilchard or sardine	198, 802, 431	618, 279	55, 496, 755	166, 108	12, 408	99		
Pompano			68	31	27	12		
Rock bass					10	1		
Rockfishes			1, 151	40	2, 955	80	1, 612, 494	44, 580
Sablefish							233, 880	3, 448
Sculpin							2, 070	21
Sea bass:								
Black			30	1				
White			199	15	4, 930	365	385	29
Shad					5	1		
Skates			490	7	2, 604	36	14, 978	207
Smelt	820	34	26, 492	1, 110	74, 984	3, 144	14, 758	619
Tuna and tunalike fishes, bonito					10	1		
Whitebait			940	52	669	37		
Other fish			335	12			1, 082	40
Total	199, 059, 326	622, 063	56, 551, 499	183, 700	265, 404	9, 323	2, 469, 001	63, 212
SHELLFISH								
Crabs					160, 394	6, 881		
Shrimp					2	1		
Octopus							1, 139	76
Squid	390	7	763, 739	12, 906	5, 566	91		
Total	390	7	763, 739	12, 906	165, 962	6, 976	1, 139	76
Grand total	199, 059, 716	622, 070	57, 315, 238	196, 606	431, 366	16, 299	2, 470, 140	63, 288

Species	Lines, troll		Paranzella nets		Traps		Rakes and shovels		Abalone outfits	
FISH										
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"California halibut"	184	$13	472	$33						
"Sole"			529, 378	20, 070						
Other			48, 059	1, 565						
Grayfish			4, 185	22						
Hake			2, 150	22						
Kingfish			2, 313	60						
"Lingcod"	1, 692	61	18, 737	661						
Perch			300	16						
Rockfishes	2, 127	65	25, 399	909						
Sablefish			4, 635	68						
Salmon	569, 859	35, 902								
Skates			7, 570	87						
Tuna and tunalike fishes, albacore	407	43								
Other fish			9, 600	192						
Total	574, 269	36, 084	652, 798	23, 705						
SHELLFISH										
Crabs			96	4	27, 554	$1, 182				
Shrimp					796	177				
Abalone									444, 300	$69, 732
Clams, Pismo							6, 524	$1, 398		
Octopus					21, 396	1, 436				
Oysters, market, Japanese							26, 824	6, 706		
Total			96	4	49, 746	2, 795	33, 348	8, 104	444, 300	69, 732
Grand total	574, 269	36, 084	652, 894	23, 709	49, 746	2, 795	33, 348	8, 104	444, 300	69, 732

Fisheries of the San Pedro district of California, 1933

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara and ring nets			Haul seines	Gill nets		
	Barracuda	Sardine	Tuna	Mackerel	Sardine	Other		Drift, barracuda	Set, sea bass	Other
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	178	825	477	453	279	4		25	19	7
On boats and shore				77		25	2	44	59	38
Total	178	825	477	530	279	29	2	69	78	45
Vessels, motor	19	80	47	48	28	1		9	7	3
Net tonnage	533	3,439	2,252	699	501	5		56	69	30
Boats:										
Motor				10		6		17	22	16
Other							1		2	6
Apparatus:										
Number	19	80	47	58	28	7	1	26	31	30
Length, yards	7,942	30,240	27,129	23,086	12,437	2,220	214			
Square yards								240,237	167,487	26,441

Item	Trammel nets	Lines		Paranzella nets	Traps, lobster	Harpoons, swordfish	Rakes and shovels	Abalone outfits	Total, exclusive of duplication
		Set and hand	Troll						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	21	344		10	28	12		4	1,610
On boats and shore	78	338	67	14	174	69	42		666
Total	99	682	67	24	202	81	42	4	2,276
Vessels, motor	8	49		3	13	4		1	184
Net tonnage	51	2,825		41	108	30		9	6,862
Boats:									
Motor	30	215	64	5	99	30			315
Other	1	28			24		1		49
Apparatus:									
Number	39	1,520	274	4	4,791	34	42	1	
Square yards	259,508								
Yards at mouth				67					
Hooks		281,547	274						

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Haul seines		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			41,369	$558				
Barracuda	545,131	$26,167	770,415	23,802			789,924	$30,846
Flounders:								
"California halibut"	134	9	774	60			998	59
"Sole"			39	2			33	1
Other			9	1				
Flyingfish	150	5					16,246	496
Grayfish	1,890	59	3,207	87			69,875	1,573
Herring							100	8
Horse mackerel	51,094	718	914,124	9,290			3,933	46
Kingfish	145	3	193,915	3,397			235	4
"Lingcod"							30	1
Mackerel	756,439	4,558	54,189,423	306,124			191,516	1,445
Mullet					38	$2	1,336	66
Perch	896	35	32,298	1,941			6,926	307
Pilchard or sardine	139,550,505	380,056	53,187,182	141,526			1,129	25
Pompano			3,672	1,185			21	5
Rock bass	15,197	749	23,105	967			4,705	203

Fisheries of the San Pedro district of California, 1933—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Purse seines		Lampara and ring nets		Haul seines		Gill nets	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Rockfishes	36	$2	134	$5			315	$13
Rudderfish	227	9	4,170	112			7,482	384
Sculpin			100	4				
Sea bass:								
Black	522	20	980	36			2,905	138
White	104,868	6,888	315,665	15,944			198,640	13,421
Sheepshead			50	2			152	4
Skates			90	1				
Smelt	1,142	34	163,804	5,377	15,036	$337	56,400	2,201
Tuna and tunalike fishes:								
Bluefin	277,967	16,077	38,879	2,346			52	5
Bonito	141,433	2,073	743,902	10,365			26,377	418
Yellowtail	141,079	5,068	30,215	943			895	42
Other fish	200	5	613	16			175	7
Total	141,589,055	442,535	110,658,134	524,091	15,074	339	1,380,490	51,718
SHELLFISH								
Squid	10,265	159	43,655	757			310	4
Grand total	141,599,320	442,694	110,701,789	524,848	15,074	339	1,380,800	51,722

Species	Trammel nets		Lines				Paranzella nets	
			Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda			177,607	$7,378	150,857	$5,468		
Flounders:								
"California halibut"	407,953	$27,701	43,655	2,891	175	11	326,832	$17,991
"Sole"	5,114	218	7,408	311			656,620	17,982
Other	274	17	12,904	1,770			625	31
Grayfish	51,177	1,268	190,271	4,854	80	2	1,894	37
Hake	150	1	5,316	39				
Horse mackerel			7,620	179				
Kingfish	100	2	165,350	2,864				
"Lingcod"	35	1	12,202	270				
Mackerel			3,784,946	32,699	273	2		
Perch	24	2	3,893	180				
Rock bass	93	4	116,212	5,551	337	13	169	10
Rockfishes	408	14	1,399,808	46,658			555	20
Rudderfish			934	32				
Sablefish			487,508	13,093				
Salmon					48	7		
Sculpin	269	12	54,489	3,273			60	5
Sea bass:								
Black	713	26	40,927	1,908				
White	648	61	12,668	1,037	50	2		
Sheepshead	1,019	29	16,399	463				
Skates	6,352	116	9,625	161			7,457	135
Smelt			4,531	155				
Swordfish			1,094	94				
Tuna and tunalike fishes:								
Albacore			40	4				
Bluefin			16	1				
Bonito	620	7	6,343	96	1,324	22		
Skipjack or striped tuna			10	1				
Whitefish			37,741	2,071				
Yellowtail	30	1	68,817	2,536	4,854	176		
Other fish	169	12	4,750	193	85	2		
Total	475,148	29,492	6,673,114	130,762	158,083	5,705	994,212	36,211
SHELLFISH								
Sea crawfish or spiny lobster	3,852	569						
Octopus			37	4				
Squid	618	12						
Total	4,470	581	37	4				
Grand total	479,618	30,073	6,673,151	130,766	158,083	5,705	994,212	36,211

Fisheries of the San Pedro district of California, 1933—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Traps		Harpoons		Rakes and shovels		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Kingfish	151	$3						
Marlin			6, 253	$257				
Perch	181	11						
Rock bass	41, 050	1, 982						
Rockfishes	455	17						
Sculpin	1, 438	99						
Sheepshead	33, 304	895						
Swordfish			574, 755	50, 455				
Tuna and tunalike fishes, albacore			40	6				
Whitefish	1, 379	76						
Total	77, 958	3, 083	581, 048	50, 718				
SHELLFISH								
Crabs	14, 818	682.						
Sea crawfish or spiny lobster	302, 835	42, 206						
Abalone							106, 968	$10, 701
Clams:								
Hard					4, 405	$1, 062		
Pismo					19, 948	4, 370		
Mussels, sea					47	23		
Octopus	22	2						
Total	317, 675	42, 890			24, 400	5, 455	106, 968	10, 701
Grand total	395, 633	45, 973	581, 048	50, 718	24, 400	5, 455	106, 968	10, 701

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Lines, set and hand		Traps	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	117, 572	$10, 320			8, 691	$605		
Cabrilla					8, 275	233		
Flounders, "California halibut"	91	8						
Grayfish					61	2		
Mullet			423	$17				
Perch					112	11		
Rock bass	170	10			12, 822	819		
Rockfishes					7, 099	218		
Sea bass:								
Black	13, 290	713			158, 826	7, 085		
White	325	46			39, 065	2, 482		
Spanish mackerel	410	8			2, 602	137		
Tai					138	4		
Tuna and tunalike fishes:								
Bluefin	236, 276	10, 504						
Bonito	154, 431	3, 492			32, 388	948		
Skipjack or striped tuna	3, 006, 823	92, 730			2, 368, 471	100, 518		
Yellowfin	2, 802, 603	113, 912			13, 226, 882	594, 180		
Whitefish	50	3			5, 178	260		
Yellowtail	15, 032	378			415, 843	13, 640		
Total	6, 347, 073	232, 124	423	17	16, 286, 453	721, 142		
SHELLFISH								
Sea crawfish or spiny lobster							21, 298	$3, 731
Grand total	6, 347, 073	232, 124	423	17	16, 286, 453	721, 142	21, 298	3, 731

Fisheries of the San Diego district of California, 1933

OPERATING UNITS: BY GEAR

Item	Lampara and ring nets		Gill nets			Trammel nets	Lines		Traps, lobster	Harpoons, swordfish and turtle	Total, exclusive of duplication
	Mackerel	Sardine	Drift, barracuda	Set, sea bass	Other		Set and hand	Troll			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	133	41	3	3	------	3	639	------	15	27	710
On boats and shore	26	18	36	44	14	30	116	41	46	29	214
Total	159	59	39	47	14	33	755	41	61	56	924
Vessels, motor	14	4	1	1	------	1	73	------	5	7	81
Net tonnage	145	44	5	5	------	7	4, 503	------	47	70	4, 562
Boats:											
Motor	3	2	16	19	10	12	59	35	35	11	97
Other	------	------	------	1	2	------	------	------	------	------	2
Apparatus:											
Number	17	6	17	21	13	13	1, 006	181	1, 308	18	------
Length, yards	5, 610	2, 550	------	------	------	------	------	------	------	------	------
Square yards	------	------	137, 003	110, 061	17, 180	128, 713	------	------	------	------	------
Hooks	------	------	------	------	------	------	55,418	181	------	------	------

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	5, 609	$139	30, 738	$787	222, 154	$6, 797	------	------
Flounders:								
"California halibut"	------	------	------	------	28	2	76, 682	$5, 310
"Sole"	------	------	------	------	------	------	64	5
Other	------	------	------	------	------	------	22	1
Grayfish	------	------	------	------	26, 141	127	14, 348	99
Herring	------	------	------	------	4, 665	62	------	------
Horse mackerel	------	------	600	6	------	------	------	------
Kingfish	------	------	13	1	172	4	35	1
Mackerel	------	------	8, 187, 781	47, 716	95, 750	578	------	------
Mullet	------	------	------	------	19, 827	800	------	------
Perch	298	12	------	------	30	1	------	------
Pilchard or sardine	------	------	532, 269	3, 347	322	3	------	------
Pompano	------	------	32	10	------	------	------	------
Rock bass	------	------	1, 542	36	1, 212	45	3, 333	172
Rockfishes	------	------	------	------	102	4	154	6
Rudderfish	------	------	------	------	339	10	------	------
Sea bass:								
Black	------	------	180	4	3, 566	114	------	------
White	236	8	182	7	163, 790	7, 291	260	28
Sheepshead	------	------	------	------	------	------	39	1
Skates	------	------	------	------	------	------	700	8
Smelt	------	------	60	2	22, 396	724	------	------
Tuna and tunalike fishes:								
Bluefin	------	------	82	5	------	------	------	------
Bonito	------	------	281, 589	5, 627	81, 786	1, 604	168	2
Yellowtail	------	------	4, 689	87	2, 496	75	140	3
Total	6, 143	159	9, 039, 757	57, 635	644, 776	18, 241	95, 945	5, 636
SHELLFISH								
Sea crawfish or spiny lobster	------	------	------	------	------	------	1, 511	202
Grand total	6, 143	159	9, 039, 757	57, 635	644, 776	18, 241	97, 456	5, 838

Fisheries of the San Diego district of California, 1933—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	204,799	$7,186	14,889	$597				
Flounders:								
"California halibut"	1,721	123						
"Sole"	3,852	326						
Grayfish	15,310	92	490	2				
Kingfish	1,341	26			82	$2		
Mackerel	1,054,830	7,210						
Marlin							606	$24
Perch	21	1						
Rock bass	99,211	3,461			24,573	1,169		
Rockfishes	551,932	18,097			1,776	67		
Sablefish	1,604	28						
Sculpin	7,914	347			124	5		
Sea bass:								
Black	69,759	2,493						
White	24,299	1,183	16	1				
Sheepshead	3,224	64			4,422	158		
Smelt	270	10						
Swordfish							234,787	17,685
Tuna and tunalike fishes:								
Bluefin	7,220	414						
Bonito	570,976	11,377	112,716	2,244				
Yellowfin	6,867	431						
Whitefish	42,108	1,673						
Yellowtail	971,177	22,155	8,894	197				
Other fish	300	12						
Total	3,641,735	76,709	137,005	3,041	30,977	1,401	235,393	17,709
SHELLFISH								
Sea crawfish or spiny lobster					72,277	10,376		
Grand total	3,641,735	76,709	137,005	3,041	103,254	11,777	235,393	17,709

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	1,661	$168			1,359	$92		
Flounders, "California halibut"							81,261	$5,581
Mullet			2,227	$111	163	5		
Pompano			710	56				
Rock bass					338	10		
Sea bass:								
Black					11,623	421		
White					175,464	11,082		
Smelt					260	13		
Tuna and tunalike fishes:								
Skipjack or striped tuna	4,302	151						
Yellowfin	183,206	7,328						
Yellowtail	120	6			2,318	45		
Total	189,289	7,653	2,937	167	191,525	11,671	81,261	5,581

Fisheries of the San Diego district of California, 1933—Continued

CATCH OFF LATIN AMERICA: BY GEAR—Continued

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	24,654	$1,744	6,873	$502				
Cabrilla	76,337	2,573						
Corbina	290	23						
Flounders, "California halibut"	44	3						
Mackerel	969	21						
Rock bass	4,308	229						
Rockfishes	36,813	1,417						
Sea bass:								
Black	145,973	5,092						
White	120,096	8,464						
Spanish mackerel	1,185	46						
Swordfish							40,063	$2,844
Tuna and tunalike fishes:								
Bonito	98,136	1,956						
Skipjack or striped tuna	11,307,702	419,691						
Yellowfin	34,856,072	1,558,980						
Whitefish	8,597	347						
Yellowtail	2,231,814	42,274	475	10				
Other fish	729	37						
Total	48,913,719	2,042,897	7,348	512			40,063	2,844
SHELLFISH								
Sea crawfish or spiny lobster					648,132	$87,461		
Turtles							2,901	125
Total					648,132	87,461	2,901	125
Grand total	48,913,719	2,042,897	7,348	512	648,132	87,461	42,964	2,969

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

HALIBUT FISHERY OF THE PACIFIC COAST[11]

The halibut fishery of the Pacific coast, which is prosecuted by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. During 1933, the total catch of halibut by vessels of both nationalities amounted to 45,951,000 pounds, valued at $2,582,000. This is an increase of 6 percent in quantity and 48 percent in value as compared with the catch and its value in 1932. Of the total catch in 1933, 82 percent was taken by United States craft and 18 percent by Canadian craft. Considered according to ports of landing 48 percent was landed at ports in the State of Washington; 37 percent at Canadian ports; and 15 percent at ports in Alaska.

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[11] These statistics were compiled from data collected by the International Fisheries Commission for Washington and British Columbia, and by Bureau agents for Alaska. The data for the Washington and Alaska landings, as well as those made by United States craft in British Columbia, are based on actual weight of the fares.

Halibut fishery of the Pacific coast, 1933

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Item	Washington fleet	Alaska fleet	Total
Regular halibut vessels:			
Number	129	86	215
Net tonnage	3,712	1,578	5,290
Crew	885	451	1,336
Dories	143	86	229
Skates of lines	3,675	2,003	5,678
Vessels in other fisheries but landing 1 or more fares of halibut:			
Number	20	9	29
Net tonnage	432	79	511
Crew	110	33	143
Dories	20	9	29
Skates of lines	434	161	595
Regular halibut boats:			
Number		27	27
Crew		67	67
Skates of lines		338	338
Boats in other fisheries but landing 1 or more fares of halibut:			
Number	1	85	86
Crew	3	135	138
Skates of lines	10	468	478

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
WASHINGTON FLEET								
Regular vessels:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut	19,579,151	$1,277,314	2,035,711	$127,082	1,214,077	$63,622	22,828,939	$1,468,018
Sablefish	1,271,209	39,540	8,565	171	22,719	370	1,302,493	40,081
"Lingcod"	417,108	12,365					417,108	12,365
Rockfishes	180,333	6,286					180,333	6,286
Total	21,447,801	1,335,505	2,044,276	127,253	1,236,796	63,992	24,728,873	1,526,750
Other vessels and boats:								
Halibut	763,174	49,450	4,130	115			767,304	49,565
Sablefish	7,867	202					7,867	202
"Lingcod"	51,021	1,261					51,021	1,261
Rockfishes	26,649	753					26,649	753
Total	848,711	51,666	4,130	115			852,841	51,781
ALASKA FLEET								
Regular vessels:								
Halibut	1,772,835	103,741	6,355,421	352,269	4,186,346	196,628	12,314,602	652,638
Sablefish	1,166	23	4,738	95	64,892	1,664	70,796	1,782
"Lingcod"	2,757	109					2,757	109
Rockfishes					1,078	22	1,078	22
Total	1,776,758	103,873	6,360,159	352,364	4,252,316	198,314	12,389,233	654,551
Other vessels and boats:								
Halibut	12,061	926	362,903	16,738	1,379,345	56,060	1,754,309	73,724
Sablefish					7,155	126	7,155	126
Total	12,061	926	362,903	16,738	1,386,500	56,186	1,761,464	73,850
COMBINED FLEETS								
Regular vessels:								
Halibut	21,351,986	1,381,055	8,391,132	479,351	5,400,423	260,250	35,143,541	2,120,656
Sablefish	1,272,375	39,563	13,303	266	87,611	2,034	1,373,289	41,863
"Lingcod"	419,865	12,474					419,865	12,474
Rockfishes	180,333	6,286			1,078	22	181,411	6,308
Total	23,224,559	1,439,378	8,404,435	479,617	5,489,112	262,306	37,118,106	2,181,301
Other vessels and boats:								
Halibut	775,235	50,376	367,033	16,853	1,379,345	56,060	2,521,613	123,289
Sablefish	7,867	202			7,155	126	15,022	328

Halibut fishery of the Pacific coast, 1933—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS—Continued

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
COMBINED FLEETS—con.								
Other vessels and boats—Continued.								
"Lingcod"	51,021	$1,261					51,021	$1,261
Rockfishes	26,649	753					26,649	753
Total	860,772	52,592	367,033	$16,853	1,386,500	$56,186	2,614,305	125,631
All vessels and boats:								
Halibut	22,127,221	1,431,431	8,758,165	496,204	6,779,768	316,310	37,665,154	2,243,945
Sablefish	1,280,242	39,765	13,303	266	94,766	2,160	1,388,311	42,191
"Lingcod"	470,886	13,735					470,886	13,735
Rockfishes	206,982	7,039			1,078	22	208,060	7,061
Grand total	24,085,331	1,491,970	8,771,468	496,470	6,875,612	318,492	39,732,411	2,306,932

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
WASHINGTON FLEET								
Regular halibut vessels	19,579	1,277	2,036	127	1,214	64	22,829	1,468
Other vessels and boats	763	49	4	(1)			767	49
Total	20,342	1,326	2,040	127	1,214	64	23,596	1,517
ALASKA FLEET								
Regular halibut vessels	1,773	104	6,355	353	4,187	196	12,315	653
Other vessels and boats	12	1	363	17	1,379	56	1,754	74
Total	1,785	105	6,718	370	5,566	252	14,069	727
COMBINED FLEETS								
Regular halibut vessels	21,352	1,381	8,391	480	5,401	260	35,144	2,121
Other vessels and boats	775	50	367	17	1,379	56	2,521	123
Total	22,127	1,431	8,758	497	6,780	316	37,665	2,244
British Columbia fleet	20	1	8,266	337			8,286	338
Grand total	22,147	1,432	17,024	834	6,780	316	45,951	2,582

[1] Less than $500.

VESSEL FISHERIES AT SEATTLE, WASH.

A total of 43,353,031 pounds of fishery products, valued at $2,443,235, were handled by Seattle wholesale dealers during 1933, exclusive of quantities received by transporting vessels or by rail from Alaska or Canada. This represents an increase of 3 percent in quantity and 36 percent in value as compared with the quantity and value of products handled during the preceding year. Of the total quantity handled 24,085,331 pounds, valued at $1,491,970, were landed by fishing vessels, a decrease of less than one-half of 1 percent in quantity but an increase of 41 percent in value as compared with the previous year. Receipts by wholesale dealers from sources other than Alaska or Canada or from vessels in the halibut fleet amounted to 19,267,700 pounds, valued at $951,265, which is an increase of 6 percent in quantity and 28 percent in value.

Fishery products landed by United States vessels at Seattle, Wash., 1933 [1]

BY FISHING GROUNDS

Fishing grounds	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2									
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
West of Cape Spencer	481	8, 991, 764	$651, 231	5, 873, 579	$329, 759	48, 412	$1, 002	7, 497	$201	10, 023	$266	14, 931, 275	$985, 459
South of Cape Spencer	728	2, 643, 128	208, 712	4, 618, 750	238, 729	1, 231, 830	38, 763	463, 389	13, 534	196, 959	6, 773	9, 154, 056	506, 511
Total	1, 209	11, 634, 892	862, 943	10, 492, 329	568, 488	1, 280, 242	39, 765	470, 886	13, 735	206, 982	7, 039	24, 085, 331	1, 491, 970

[1] Halibut fleet.

BY MONTHS

Fishing grounds	Trips	Halibut No. 1 Pounds	Halibut No. 1 Value	Halibut No. 2 Pounds	Halibut No. 2 Value	Sablefish Pounds	Sablefish Value	"Lingcod" Pounds	"Lingcod" Value	Rockfishes Pounds	Rockfishes Value	Total Pounds	Total Value
January	11	----------	----------	----------	----------	500	31	42, 758	2, 335	32, 305	1, 762	75, 563	4, 128
February	127	1, 684, 671	81, 731	785, 300	23, 875	6, 061	113	29, 718	569	6, 540	129	2, 512, 290	106, 417
March	134	1, 503, 943	100, 068	873, 718	44, 399	20, 516	570	19, 024	577	10, 337	346	2, 427, 538	145, 960
April	138	849, 249	68, 268	1, 093, 953	56, 106	13, 977	342	75, 588	1, 542	17, 966	392	2, 050, 733	126, 650
May	156	1, 443, 628	92, 786	1, 378, 880	58, 272	4, 381	62	73, 767	1, 262	18, 195	304	2, 918, 851	152, 686
June	150	1, 323, 451	93, 308	1, 438, 703	59, 144	72, 427	2, 089	56, 030	1, 024	25, 998	484	2, 916, 609	156, 049
July	110	1, 031, 763	82, 008	1, 229, 595	68, 171	101, 355	2, 804	19, 290	383	9, 569	191	2, 391, 572	153, 557
August	135	1, 216, 477	101, 300	1, 548, 180	100, 646	108, 636	2, 889	24, 750	586	19, 463	396	2, 917, 506	205, 817
September	81	1, 032, 970	99, 328	874, 149	64, 415	276, 630	8, 331	3, 244	98	3, 358	79	2, 190, 351	172, 251
October	90	1, 012, 703	99, 743	914, 469	71, 517	369, 963	12, 227	18, 469	635	4, 517	183	2, 350, 121	184, 305
November	59	506, 037	41, 403	355, 382	21, 943	292, 189	9, 755	42, 598	1, 498	14, 158	623	1, 210, 364	78, 222
December	18	----------	----------	----------	----------	13, 607	552	65, 650	3, 226	44, 576	2, 150	123, 833	5, 928
Total	1, 209	11, 634, 892	862, 943	10, 492, 329	568, 488	1, 280, 242	39, 765	470, 886	13, 735	206, 982	7, 039	24, 085, 331	1, 491, 970

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[1] This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.

Fishery products received by Seattle wholesale dealers, 1933: By months [1]

Species	January		February		March		April		May		June	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
lounders:												
"Sole"	66, 006	$1, 673	42, 891	$1, 080	60, 227	$1, 723	58, 487	$1, 673	52, 514	$1, 214	38, 177	$1, 043
Other	4, 119	42	1, 100	14	2, 030	31	2, 438	37	2, 993	30	469	2
Halibut					4, 991	249	4, 316	215	8, 910	624	60, 846	3, 353
Herring	3, 395	53	13, 455	73	149, 800	1, 321	23, 200	116				
"Lingcod"	14, 575	576	14, 584	438	18, 257	584	12, 806	194	15, 832	364	38, 822	458
Perch	3, 607	73	4, 337	160	13, 562	579	7, 527	133	3, 446	110	2, 198	60
Rockfishes	18, 917	479	15, 767	571	9, 836	287	10, 136	227	8, 677	259	9, 956	241
Sablefish											5, 510	193
Salmon:												
Blueback, red or sockeye									420	34	23, 179	1, 623
Chinook or king	1, 543	123	11, 843	1, 421	108, 101	12, 856	312, 533	26, 685	237, 928	18, 567	857, 590	58, 478
Chum or keta									155	6	2, 738	56
Humpback or pink												
Silver or coho	752	53	34	2					4, 985	272	16, 156	601
Smelt	14, 781	512	10, 328	227	33, 050	641			3, 685	254	23, 510	1, 122
Steelhead trout	6, 175	556	7, 886	774	4, 934	588			10, 005	600	15, 970	928
Sturgeon											450	32
Crabs	47, 683	3, 280	55, 350	3, 474	50, 799	3, 220	43, 869	2, 858	75, 544	3, 955	44, 385	2, 452
Octopus	1, 813	91	1, 796	90	2. 588	129	2, 193	110	1, 302	65	2, 150	107
Total	183. 366	7, 511	179. 371	8. 324	458. 175	22. 208	477, 505	32, 248	426, 396	26. 354	1, 142. 106	70, 749

Species	July		August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:														
"Sole"	51, 328	$1, 505	25, 816	$643	37, 057	$1, 202	47, 525	$1, 402	34, 839	$1, 143	33, 670	$1, 049	548, 537	$15, 350
Other	42	1	543	13	92	1	1, 126	26	3, 993	61	1, 536	32	20, 481	290
Halibut	23, 380	1, 403	30, 563	1, 377	413	31							133, 419	7, 252
Herring							1, 365	14			653	19	191, 868	1, 596
"Lingcod"	12, 822	252	29, 844	471	21, 439	571	12, 253	457	32, 852	1, 179	9, 565	409	233, 651	5, 953
Perch	2, 129	60	4, 984	128	3, 899	97	4, 470	120	3, 766	75	4, 454	178	58, 379	1, 773
Rockfishes	3, 042	98	5, 855	80	5, 338	92	8, 656	283	13, 054	477	13, 838	444	123, 072	3, 538
Sablefish			1, 030	31	17, 783	536	22, 785	911	8, 964	275			56, 072	1, 946
Salmon:														
Blueback, red or sockeye	289, 843	23, 999	64, 652	4, 235	12, 622	917							390, 716	30, 808
Chinook or king	1, 246, 072	72, 430	1, 729, 151	139, 695	436, 612	27, 252	133, 084	7, 161	52, 915	3, 134			5, 127, 402	367, 802
Chum or keta	6, 548	196	35, 417	696	190, 763	5, 095	2, 958, 158	82, 334	788, 669	23, 276	2, 278	32	3, 984, 726	111, 691
Humpback or pink	27, 740	560	901, 840	20, 793	1, 590, 280	42, 307	3, 805	91					2, 523, 665	63, 751
Silver or coho	253, 259	12, 856	922, 645	51, 495	1, 497, 164	83, 552	1, 583, 619	95, 122	351, 806	22, 873	128, 059	5, 511	4, 758, 479	272, 337
Smelt	30, 798	1, 234	37, 647	1, 632	30, 445	1, 879	26, 603	1, 506	26, 678	1, 573	20, 889	1, 452	258, 414	12, 032
Steelhead trout	81, 972	6, 437	51, 479	3, 909	25, 190	1, 484	5, 256	297	6, 770	540	20, 965	1, 715	236, 602	17, 828
Sturgeon	868	39	962	77			132	16					2, 412	164
Crabs	26, 400	1, 619	28, 581	1, 611	18, 700	1, 144	58, 458	3, 202	91, 581	6, 145	53, 550	3, 040	[2] 594, 900	36, 000
Octopus	357	18	1, 220	61	2, 337	117	3, 580	143	3, 821	1, 5 3	1, 748	70	24, 905	1, 165
Total	2, 056, 600	122, 707	3, 872, 229	226, 947	3, 890, 164	166, 277	4, 870. 875	193. 085	1, 419, 708	60, 904	291, 205	13, 951	19, 267, 700	951, 254

[1] This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.

[2] 28,414 dozen.

LAKE FISHERIES[12]

The most recent catch statistics of the fisheries of the Great Lakes, including the international lakes of northern Minnesota, are those collected for the year 1932 and the most recent complete statistics on fisheries wholesale and manufacturing industries in the same region are for 1931. The yield of these fisheries in 1932 in the United States amounted to 83,744,389 pounds valued at $4,389,061 to the fishermen, representing a decrease of 9 percent in quantity and 27 percent in value as compared with the catch and its value in 1931. Detailed statistics of the operating units and catch of the Lake fisheries for 1932 appear in "Fishery Industries of the United States, 1933", Appendix I to the Report of the Commissioner of Fisheries for the fiscal year 1934 while data on wholesale and manufacturing industries for 1931 are published in "Fisheries Industries of the United States, 1932", Appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries appears in the following tables.

Lake fisheries, 1932 [1]

OPERATING UNITS: BY STATES

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	85	112	96	824	15	48	525		1,705
On boats and shore:									
Regular	98	24	601	1,704	10	2	368	252	3,059
Casual	130		249	870	49	10	638	222	2,168
Total	313	136	946	3,398	74	60	1,531	474	6,932
Vessels:									
Steam	5	12	7	51	1	1	29		106
Net tonnage	122	298	227	926	22	13	756		2,364
Motor	12	9	12	189	3	13	154		392
Net tonnage	87	95	138	1,818	41	183	1,693		4,055
Total vessels	17	21	19	240	4	14	183		498
Total net tonnage	209	393	365	2,744	63	196	2,449		6,419
Boats:									
Motor	71	7	251	879	51	7	244	114	1,624
Other	115	10	300	555	33		218	304	1,535

[1] The statistics of the catch from 1929 to 1932, inclusive, include data on crawfish, mussels, pearls and slugs which were omitted in most of the surveys prior to 1929. Data on the catch in Wisconsin for 1929 and in subsequent years also are not strictly comparable with data for previous years due to a more complete method of collection adopted in the more recent statistics. Data for the years 1929 to 1932 are shown on the basis of round weight whereas they formerly included dressed or partially dressed fish in some cases.

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[12] The statistics of the catch presented herewith were obtained principally from the records of the various State fishery agencies and from the Dominion Bureau of Statistics, Ottawa, Canada. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by Bureau agents in a special canvass; although State records in several instances were very helpful in this work. In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for two seasons. For Lake of the Woods the seasons are from June 2 to Nov. 1 and Dec. 1 to Apr. 1 and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catches for these two seasons, in the order named, have been combined to constitute a year The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 is estimated at less than 3 percent of the total catch. For a clearer understanding of the statistics published in this section the reader is referred to the section in the latter part of the document entitled "Statistical survey procedure."

Lake fisheries, 1932—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apparatus:									
Haul seines	18		123	141			50		332
Length, yards	2,190		70,485	49,592			16,829		139,096
Gill nets:									
"Bull", 3 to 3 1/16 inches	584								584
Square yards	233,600								233,600
"Shoal", 2¼ to 3⅞ inches	2,009	4,494	6,001	9,436	361	1,380	10,814	3,614	38,109
Square yards	314,913	741,840	919,050	2,160,607	105,750	288,640	3,070,299	1,196,403	8,797,502
"Shoal", 4 to 5¾ inches	2,751	3,684	563	39,453	440	1,122	14,366	1,818	64,197
Square yards	455,688	933,104	84,450	11,363,279	129,167	338,668	4,548,867	685,425	18,538,648
"Shoal", 6 to 9¾ inches	142			344	30		40		556
Square yards	26,464			41,549	6,300		6,600		80,913
"Shoal", 10 to 14 inches	72								72
Square yards	16,800								16,800
Trammel nets			222				4		226
Square yards			9,324				413		9,737
Lines:									
Hand				6					6
Hooks				7					7
Troll				41					41
Hooks				46					46
Trot	62			1,763		5	816	403	3,049
Hooks	14,050			670,630		500	236,350	38,930	960,460
Pound nets		45	18	1,395	7	1	294	73	1,833
Trap nets	173	8	3,875	3,365			5		7,426
Fyke nets	131		633	935			759	116	2,574
Crawfish pots							2,910		2,910
Crowfoot bars				315	40		5		360
Picks				124			2		126

CATCH: BY STATES

Species	New York		Pennsylvania		Ohio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	556,052	$27,136	1,606,925	$72,311	7,784,487	$311,660
Burbot	22,758	782	1,839	19	246,096	2,465
Carp	78,098	3,747	7,203	309	1,789,732	35,792
Catfish and bullheads	67,656	3,181	2,823	191	444,802	18,434
Cisco	27,464	2,746	82,836	8,283	49,915	5,990
Eels	43,536	1,306				
Goldfish					44,013	441
Lake herring	72,793	5,446				
Lake trout	26,975	3,453	1,051	126		
Mooneye			500	5	15,184	150
Pike or pickerel (jacks)	14,853	1,202			1,355	106
Rock bass	1,208	39				
Sauger					3,088,883	122,351
Sheepshead			13,859	328	2,069,439	41,395
Sturgeon	27,921	5,825	607	101		
Sucker "mullet"	108,467	4,329	13,824	275	1,094,792	21,893
Sunfish	8,084	256				
White bass	2,840	113	9,252	369	240,603	9,328
Whitefish, common	250,120	43,581	447,388	67,505	507,084	76,060
Yellow perch	102,296	6,556	329,676	15,694	9,239,058	329,999
Yellow pike	23,354	2,508	17,477	1,746	1,900,386	184,520
Total	1,434,475	112,206	2,535,260	167,262	28,515,829	1,160,584

Lake fisheries, 1932—Continued

CATCH: BY STATES—Continued

Species	Michigan		Indiana		Illinois	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,948	$59				
Buffalofish			1,910	$100		
Burbot	19,575	241	3,962	220		
Carp	2,141,439	72,206	3,320	119	200	$4
Catfish and bullheads	258,415	20,018				
Chubs	946,429	68,531	184,698	16,473	467,445	28,704
Goldfish	4,520	90				
Lake herring	3,442,460	86,099	123,050	5,076	85,580	3,444
Lake trout	6,813,110	630,361	98,391	8,307	280,605	21,877
Pike or pickerel (jacks)	60,584	4,813				
Rock bass	16,292	605				
Sauger	142,798	6,705				
Sheepshead	75,039	2,257				
Smelt	22,004	660				
Steelhead trout			4,100	650		
Sucker "mullet"	3,810,061	85,206	2,030	85		
Whitefish:						
Common	7,787,861	865,750	9,210	858	3,240	360
Menominee	141,598	13,895				
Yellow perch	1,006,324	65,955	23,238	1,831	47,715	3,573
Yellow pike	1,759,108	213,474	6,430	793		
Mussel shells [2]	1,678,984	23,181	170,000	2,210		
Pearls and slugs [2]		1,454		170		
Total	30,129,549	2,161,560	630,339	36,892	884,785	57,962

Species	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					9,947,464	$411,107
Bowfin					2,948	59
Buffalofish					1,910	100
Burbot	36,841	$553	45	$1	331,116	4,281
Carp	256,707	5,789	6,870	132	4,283,569	118,098
Catfish and bullheads	50,256	3,528	9,412	455	833,364	45,807
Chubs	2,430,070	134,014	27,870	550	4,056,512	248,272
Cisco					160,215	17,019
Crappie			1,018	193	1,018	193
Eels					43,536	1,306
Goldfish					48,533	531
Lake herring	2,839,056	26,941	5,123,435	54,251	11,686,374	181,257
Lake trout	2,909,113	208,185	532,467	47,282	10,661,712	919,591
Mooneye					15,684	155
Pike or pickerel (jacks)	76,178	4,790	219,586	5,413	372,556	16,324
Rock bass					17,500	644
Sauger			215,898	6,163	3,447,579	135,219
Sheepshead	167	6			2,158,504	43,986
Smelt	75,803	2,653			97,807	3,313
Steelhead trout	950	124			5,050	774
Sturgeon			1,384	355	29,912	6,281
Sucker "mullet"	1,042,315	23,998	120,871	1,470	6,192,360	137,256
Sunfish					8,084	256
Tullibees			1,296,668	16,104	1,296,668	16,104
White bass					252,695	9,810
Whitefish:						
Common	548,739	36,314	176,862	11,214	9,730,504	1,101,642
Menominee	89,108	3,219	1,968	89	232,674	17,203
Yellow perch	682,563	41,633	41,630	1,661	11,472,500	466,902
Yellow pike	3,365	472	731,330	53,820	4,441,450	457,333
Crawfish	19,677	984			19,677	984
Mussel shells [2]	45,930	239			1,894,914	25,630
Pearls and slugs [2]						1,624
Total	11,106,838	493,442	8,507,314	199,153	83,744,389	4,389,061

[2] From streams tributary to Lakes Michigan, Huron, and Erie.

Industries related to the fisheries of the Lake States

OPERATING UNITS SALARIES, AND WAGES, 1931

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged	--------	--------	15	4	--------	--------	--------	--------	19
Vessels, motor	--------	--------	8	1	--------	--------	--------	--------	9
Net tonnage	--------	--------	88	32	--------	--------	--------	--------	120
Wholesale and manufacturing:									
Establishments	16	8	41	57	3	55	35	15	230
Persons engaged:									
Proprietors	15	14	58	67	3	26	33	9	225
Salaried employees	22	7	63	54	1	249	48	27	471
Wage earners:									
Average for season	69	58	249	438	4	352	275	61	1,506
Average for year	54	53	215	193	4	318	150	47	1,034
Paid to salaried employees	$36,516	$24,225	$201,954	$157,875	$5,500	$765,402	$109,407	$49,010	$1,349,889
Paid to wage earners	$58,062	$59,860	$261,908	$183,872	$5,500	$479,437	$167,271	$44,640	$1,260,550
Total salaries and wages	$94,578	$84,085	$463,862	$341,747	$11,000	$1,244,839	$276,678	$93,650	$2,610,439
Fishermen manufacturing	2	2	--------	37	3	12	50	--------	106

PRODUCTS MANUFACTURED

Item	New York		Pennsylvania		Ohio		Michigan	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Chubs, smoked ... pounds	(1)	(1)	--------	-------	(1)	(1)	269,800	$67,591
Eels, smoked ... do	(1)	(1)	--------	-------	--------	--------	--------	-------
Lake herring:								
Salted ... do	--------	--------	--------	-------	--------	--------	2,052,300	52,433
Smoked ... do	(1)	(1)	--------	-------	(1)	(1)	(1)	(1)
Lake trout, smoked ... do	--------	--------	--------	-------	(1)	(1)	21,245	4,570
Pike:								
Fresh fillets [3] ... do	284,678	$66,298	179,610	$36,558	1,244,370	$232,285	--------	-------
Frozen fillets [3] ... do	68,673	15,211	61,136	11,827	111,079	19,969	--------	-------
Salmon, smoked ... do	(1)	(1)	--------	-------	115,000	24,200	(1)	(1)
Sturgeon, smoked ... do	(1)	(1)	--------	-------	12,150	8,135	--------	-------
Tullibee, smoked ... do	(1)	(1)	--------	-------	142,500	28,230	--------	-------
Whitefish, smoked ... do	(1)	(1)	--------	-------	44,500	9,780	18,579	4,255
Yellow perch:								
Fresh fillets [3] ... do	12,161	2,895	61,045	13,756	520,166	100,989	--------	-------
Frozen fillets [3] ... do	(1)	(1)	4,000	770	81,731	15,744	--------	-------
Unclassified products:								
Fillets, fresh and frozen [3] ... pounds	(4)	(4)	(4)	(4)	[5] 121,880	[5] 19,376	--------	-------
Smoked ... do	--------	--------	--------	-------	[8] 90,000	[8] 24,440	(4)	(4)
Miscellaneous [9]	[10] 298,000	[10] 70,440	[11] 770	[11] 118	--------	--------	[12] 25,085	[12] 4,692
Total	663,512	154,844	306,561	63,029	2,483,376	483,148	2,387,009	133,541

[1] The production of this item is included under "Unclassified products."

[3] Data are for 1933.

[4] The production of this item is included under "Miscellaneous."

[5] Includes fresh fillets of lake trout and whitefish; and fresh and frozen fillets of sheepshead and white bass.

[8] Includes smoked carp, chubs, lake herring, lake trout, paddlefish, or spoonbill cat and sablefish.

[9] Both 1931 and 1933 data are included in these items.

[10] Includes smoked chubs, ciscoes, eels, lake herring, salmon, sturgeon, tullibees, and whitefish; and frozen fillets of yellow perch.

[11] Includes fresh fillets of sheepshead and white bass.

[12] Includes smoked buffalofish, butterfish, carp, lake herring, sablefish, salmon, and whitefish; and pickled sea herring.

Industries related to the fisheries of the Lake States—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		Pennsylvania		Ohio		Michigan	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By fishermen:								
Chubs, smoked.......pounds..	--------	--------	--------	--------	--------	--------	17,700	$5,010
Lake herring:								
Salted..............do....	--------	--------	--------	--------	--------	--------	249,600	6,911
Smoked..............do....	--------	--------	--------	--------	--------	--------	6,250	1,222
Lake trout, smoked.....do....	--------	--------	--------	--------	--------	--------	550	153
Sturgeon roe, salted.....do....	45	$52	50	$50	--------	--------	--------	--------
Whitefish, smoked......do....	--------	--------	--------	--------	--------	--------	5,500	1,290
Total........................	45	52	50	50	--------	--------	279,600	14,616
Grand total..................	663,557	154,896	306,611	63,079	2,483,376	$483,148	2,666,609	148,157

Item	Indiana		Illinois		Wisconsin		Minnesota	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Chubs, smoked..pounds..	(2)	(2)	[2] 905,476	[2] $218,931	665,562	$119,346	(1)	(1)
Eels, smoked.......do....	--------	--------	17,804	4,483	--------	--------	--------	--------
Lake herring:								
Salted.........do....	--------	--------	--------	--------	923,350	17,906	--------	--------
Smoked........do....	--------	--------	(1)	(1)	456,832	22,529	(1)	(1)
Lake trout, smoked.do....	(2)	(2)	[2] 13,803	[2] 3,534	160,290	28,847	(1)	(1)
Pike:								
Fresh fillets [3]...do....	--------	--------	984,927	202,965	(1)	(1)	--------	--------
Frozen fillets [3]..do....	--------	--------	(1)	(1)	--------	--------	--------	--------
Salmon, smoked....do....	--------	--------	636,965	161,866	37,360	6,364	(1)	(1)
Sturgeon, smoked...do....	--------	--------	(1)	(1)	--------	--------	--------	--------
Tullibee, smoked...do....	--------	--------	325,536	65,165	(1)	(1)	(1)	(1)
Whitefish, smoked.do....	--------	--------	(1)	(1)	100,267	19,840	(1)	(1)
Yellow perch:								
Fresh fillets [3]...do....	--------	--------	103,241	24,077	63,500	13,715	--------	--------
Unclassified products:								
Fillets, fresh and frozen [3]....pounds..	--------	--------	[6] 109,218	[6] 20,171	[7] 55,000	[7] 10,100	--------	--------
Smoked........do....	--------	--------	(4)	(4)	(4)	(4)	(4)	(4)
Miscellaneous [9].......	--------	--------	[13] 2,713,986	[13] 49,240	--------	[14] 34,253	[15] 170,250	[15] $33,664
Total..............	--------	--------	5,810,956	750,432	--------	272,900	170,250	33,664
By fishermen:								
Chubs, smoked..pounds..	42,200	$10,550	53,000	10,600	--------	--------	--------	--------
Lake herring, salted.do....	--------	--------	--------	--------	1,027,000	25,675	--------	--------
Lake trout, smoked.do....	8,450	2,113	--------	--------	--------	--------	--------	--------
Whitefish, smoked.do....	750	188	--------	--------	--------	--------	--------	--------
Total..................	51,400	12,851	53,000	10,600	1,027,000	25,675	--------	--------
Grand total............	51,400	12,851	5,863,956	761,032	--------	298,575	170,250	33,664

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[1] The production of this item is included under "Unclassified."

[2] A small amount of smoked schub and lake trout produced in Indiana is included with Illinois.

[3] Data are for 1933.

[4] The production of this item is included under "Miscellaneous."

[6] Includes fresh fillets of lake trout, sheepshead, white bass, and whitefish; and frozen fillets of pike.

[7] Includes fresh fillets of pike, lake herring, and lake trout.

[9] Both 1931 and 1933 data are included in these items.

[13] Includes smoked buffalofish, butterfish, carp, flounders, lake herring, mackerel, sablefish, shad, sturgeon, and whitefish; and pickled sea herring.

[14] Includes pickled sea herring, smoked tullibees, spiced alewives, canned whitefish caviar, and mussel-shell products.

[15] Includes smoked chubs, lake herring, lake trout, salmon, suckers, tullibees, and whitefish; and salted lake trout.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of manufactured products for the Lake States was as follows: By manufacturing establishments, $1,891,558; and by fishermen, $63,844. Some of the above products may have been manufactured from products imported from another State or country; therefore they cannot be correlated directly with the catch within the State.

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES[13]

The most recent complete catch statistics of the fisheries for the States of the Mississippi River and tributaries are those collected for the year 1931. The yield of fishery products in that year amounted to 82,382,523 pounds, valued at $2,897,357, which was a decrease of 22 percent in quantity and 36 percent in value as compared with the quantity and value of the catch in 1922 when the most recent preceding survey was made. Detailed statistics of the fisheries of the Mississippi River and tributaries for 1931 appear in "Fishery Industries of the United States, 1932" by R. H. Fiedler, Appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries in 1931 as well as certain data for 1933 appear in the following tables.

Fisheries of the Mississippi River and tributaries, 1931

OPERATING UNITS: BY STATES

Items	Alabama	Arkansas	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Minnesota
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	104	1, 463	708	20	245	35	89	1, 402	160
Casual	131	1, 524	1, 318	1, 735	648	88	440	3, 108	578
Total	235	2, 987	2, 026	1, 755	893	123	529	4, 510	738
Boats:									
Motor	32	907	676	544	309	18	92	1, 225	65
Other	190	2, 359	957	1, 189	457	123	420	2, 369	446
Apparatus:									
Haul seines	--------	16	127	50	133	--------	24	377	113
Length, yards	--------	7, 308	33, 975	5, 170	36, 339	--------	2, 057	85, 166	49, 968
Anchor gill nets	--------	4	--------	--------	--------	--------	--------	74	9
Square yards	--------	2, 800	--------	--------	--------	--------	--------	17, 400	9, 999
Trammel nets	--------	31	28	3	--------	90	--------	78	--------
Square yards	--------	3, 899	4, 890	360	--------	9, 026	--------	19, 696	--------
Lines:									
Trot	449	5, 327	1, 312	320	1, 158	17	627	5, 757	186
Hooks	35, 980	455, 000	124, 715	16, 767	186, 250	360	37, 395	1, 392, 200	41, 800
Pound nets	--------	--------	--------	--------	2	--------	--------	--------	27
Fyke nets	610	5, 346	9, 852	335	1, 981	189	1, 231	5, 908	74
Dip nets	--------	--------	22	--------	10	--------	--------	159	--------
Traps:									
Crawfish	--------	--------	--------	--------	--------	--------	--------	18	--------
Shrimp	--------	--------	--------	--------	--------	--------	--------	88	--------
Baskets	--------	--------	3, 769	--------	--------	--------	--------	--------	--------
Mussel dredges	--------	426	14	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	286	10	--------	--------	--------	--------	--------	--------
Crowfoot bars	168	1, 038	840	1, 092	464	--------	256	10	192
Tongs	--------	159	--------	72	--------	--------	--------	5	--------
Rakes	--------	70	--------	--------	--------	--------	--------	--------	--------
Forks	--------	102	33	1, 278	--------	29	--------	5	--------
Grabs	--------	--------	--------	--------	--------	--------	--------	2, 232	--------

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[13] For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of the document entitled "Statistical survey procedure."

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: BY STATES—Continued

Items	Mississippi	Missouri	Nebraska	Ohio	Oklahoma	South Dakota	Tennessee	Texas	Wisconsin	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:										
Regular	211	177			5		327	5	202	5, 153
Casual	198	170	299	49	19	67	206	41	112	10, 731
Total	409	347	299	49	24	67	533	46	314	15, 884
Boats:										
Motor	138	84	30			2	138	6	160	4, 426
Other	329	304	187	49	18	34	467	42	180	10, 120
Apparatus:										
Haul seines	16	47	12	2	2	11			83	1, 013
Length, yards	6, 885	5, 668	906	180	60	1, 948			20, 149	255, 779
Anchor gill nets	4	1			3				6	101
Square yards	800	160			990				13, 488	45, 637
Trammel nets	17	104	115				52			518
Square yards	2, 867	14, 668	4, 833				3, 560			63, 799
Lines:										
Hand							67			67
Hooks							67			67
Trot	847	516		19	29	18	464	80	3	17, 129
Hooks	72, 155	34, 600		900	1, 075	3, 600	41, 690	14, 500	125	2, 459, 112
Pound nets									345	374
Fyke nets	2, 591	1, 872	296	76	85	68	1, 735	70	222	32, 541
Dip nets										191
Traps:										
Crawfish										18
Shrimp	350									438
Baskets										3, 769
Spears							12			12
Mussel dredges										440
Yards at mouth										296
Crowfoot bars							230		190	4, 480
Tongs		9								245
Rakes										70
Forks										1, 447
Grabs										2, 232

CATCH: BY STATES

Species	Alabama		Arkansas		Illinois		Indiana	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			700	$28	8, 308	$241		
Buffalofish	21, 330	$2, 312	2, 182, 446	131, 474	911, 609	51, 893	85, 045	$8, 156
Carp	11, 000	1, 118	808, 206	27, 268	4, 878, 744	128, 217	157, 641	10, 162
Catfish and bullheads	81, 200	8, 850	1, 077, 343	93, 150	647, 696	68, 890	35, 370	5, 302
Crappie	9, 772	1, 004	11, 325	227				
Eels					4, 985	322		
Mooneye					1, 000	20		
Paddlefish or spoonbill cat	3, 958	338	93, 200	2, 159	104, 846	5, 480	16, 492	1, 724
Quillback or "American carp"	7, 657	875	6, 830	676	17, 532	608	30, 312	1, 436
Sheepshead	45, 909	4, 972	676, 358	29, 877	177, 709	11, 321	38, 740	3, 711
Sturgeon, shovelnose	575	70			39, 766	3, 448	3, 013	292
Sucker "mullet"	5, 752	609	3, 309	235	25, 130	1, 087	16, 797	1, 156
White bass					1, 200	92		
Yellow pike							4, 550	693
Total	187, 153	20, 178	4, 859, 717	285, 094	6, 818, 525	271, 623	387, 960	32, 632
SHELLFISH, ETC.								
Mussel shells	1, 635, 000	10, 132	10, 872, 790	108, 819	7, 429, 528	82, 894	7, 328, 736	105, 632
Pearls				3, 137		190		125
Slugs		2, 444		14, 401		11, 835		18, 788
Turtles:								
Snapper					14, 577	696	500	25
Soft shell							400	20
Total	1, 635, 000	12, 576	10, 872, 790	126, 357	7, 444, 105	95, 615	7, 329, 636	124, 590
Grand total	1, 822, 153	32, 754	15, 732, 507	411, 451	14, 262, 630	367, 238	7, 717, 596	157, 222

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Iowa		Kansas		Kentucky		Louisiana	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	91, 825	$3, 759					5, 715	$114
Buffalofish	746, 615	59, 705	24, 325	$2, 222	164, 558	$14, 429	8, 784, 314	263, 261
Carp	1, 594, 244	80, 134	117, 489	10, 956	113, 461	8, 124	204, 743	4, 127
Catfish and bullheads	467, 340	48, 593	770	111	131, 777	17, 043	6, 602, 987	528, 579
Eels	325	15					200	6
Garfish							72, 450	791
Mooneye	1. 100	28			990	105		
Paddlefish or spoonbill cat	9, 400	638			18, 322	1, 617	495, 544	21, 508
Pike or pickerel	4, 700	470						
Quillback or "American carp"	60, 450	1, 339	100	11	11, 355	984	20, 700	431
Sauger					2, 365	451		
Sheepshead	343, 449	17, 619			52, 560	6, 762	1, 976, 600	39, 577
Sturgeon. shovelnose	17, 650	1, 663	175	24	2, 967	380		
Sucker "mullet"	36, 550	822			10, 294	1, 331		
Yellow pike					70	18		
Total	3, 373, 648	214, 785	142, 859	13, 324	508, 719	51, 244	18, 163, 253	858, 394
SHELLFISH, ETC.								
Crawfish							29, 248	292
Shrimp							38, 503	2, 423
Mussel shells	4, 366, 219	65, 685	312, 562	2, 713	1, 113, 032	8, 786	50, 000	375
Pearls		7, 244						
Slugs		13, 924		636		852		
Frogs							872, 651	130, 612
Terrapin	19, 100	377						
Turtles:								
Snapper	2, 000	40					58, 013	2, 244
Soft-shell	17, 000	340					1, 700	34
Total	4, 404, 319	87, 610	312. 562	3, 349	1, 113, 032	9, 638	1, 050, 115	135, 980
Grand total	7, 777, 967	302, 395	455, 421	16, 673	1, 621, 751	60, 882	19, 213, 368	994, 374

Species	Minnesota		Mississippi		Missouri		Nebraska	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	16, 598	$282			17, 000	$520		
Buffalofish	257, 431	15, 092	1, 511, 126	$63, 824	178, 991	16, 414	18, 104	$1, 813
Carp	2, 151, 119	97, 756	225, 276	6, 730	433, 117	33, 356	93, 032	9, 305
Catfish and bullheads	53, 804	4, 841	635, 049	42, 384	91, 430	15, 487	34, 174	5, 135
Eels			250	20	1, 055	53		
Minnows					525	209		
Paddlefish or spoonbill cat			158, 821	5, 879	40, 103	2, 917		
Quillback or "American carp"	17, 246	519	2, 157	42	13, 672	946		
Sheepshead	152, 545	7, 938	106, 844	2, 576	38, 186	3, 773		
Sturgeon, shovelnose	1, 634	115	100	3	17, 282	1, 703		
Sucker "mullet"	65, 273	1, 955			2, 275	292		
Total	2, 715, 650	128, 498	2, 639, 623	121, 458	833, 636	75, 670	145, 310	16, 253
SHELLFISH, ETC.								
Shrimp			10, 000	1, 500				
Mussel shells	782, 630	7, 827			94, 000	1, 193		
Pearls		157						
Slugs		1, 174				118		
Turtles, snapper			100	3				
Total	782, 630	9, 158	10, 100	1, 503	94, 000	1, 311		
Grand total	3, 498, 280	137, 656	2, 649, 723	122, 961	927, 636	76, 981	145, 310	16, 253

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Ohio		Oklahoma		South Dakota		Tennessee	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass							14,000	$1,680
Buffalofish	6,433	$662	21,605	$2,142	38,926	$3,894	478,592	31,247
Carp	14,370	1,543	4,268	425	52,836	2,642	247,841	9,594
Catfish and bullheads	4,380	811	4,935	695	13,500	3,528	271,753	21,750
Crappie					1,392	70	18,652	1,658
Eels							163	25
Paddlefish or spoonbill cat			5,332	533	400	40	5,034	301
Quillback or "American carp"	1,195	119	1,950	195	4,364	220	6,065	843
Sheepshead	1,318	224	1,550	155	697	70	197,670	10,465
Sturgeon, shovelnose	558	72					3,706	393
Sucker "mullet"	2,902	268			2,246	112	8,323	1,119
Sunfish							21,850	1,094
White bass							2,100	106
Yellow pike	325	60						
Total	31,481	3,759	39,640	4,145	114,361	10,576	1,275,749	86,275
SHELLFISH, ETC.								
Mussel shells	154,000	3,005					2,157,000	15,604
Pearls								28
Slugs		308						1,724
Frogs							2,250	270
Terrapin							70	14
Total	154,000	3,313					2,159,320	17,640
Grand total	185,481	7,072	39,640	4,145	114,361	10,576	3,435,069	103,915

Species	Texas		Wisconsin		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					14,000	$1,680
Bowfin			288,170	$4,355	428,316	9,299
Buffalofish	73,000	$2,190	268,001	13,528	15,772,451	687,288
Carp	6,900	138	777,474	23,800	11,891,761	455,399
Catfish and bullheads	47,800	3,824	65,539	5,825	10,266,847	877,798
Crappie					41,141	2,959
Eels					6,978	441
Garfish					72,450	791
Minnows					525	209
Mooneye					3,090	153
Paddlefish or spoonbill cat					951,452	43,134
Pike or pickerel					4,700	470
Quillback or "American carp"	500	10	66,353	2,032	268,438	11,286
Sauger					2,365	451
Sheepshead	10,300	206	84,409	3,692	3,904,844	142,938
Sturgeon, shovelnose					87,426	8,163
Sucker "mullet"			135,984	3,696	314,835	12,682
Sunfish					21,850	1,094
White bass					3,300	198
Yellow pike					4,945	771
Total	138,500	6,368	1,685,930	56,928	44,061,714	2,257,204
SHELLFISH, ETC.						
Crawfish					29,248	292
Shrimp					48,503	3,923
Mussel shells			959,200	8,946	37,254,697	421,611
Pearls				555		11,436
Slugs				2,012		68,216
Frogs					874,901	130,882
Terrapin					19,170	391
Turtles:						
Snapper					75,190	3,008
Soft-shell					19,100	394
Total			959,200	11,513	38,320,809	640,153
Grand total	138,500	6,368	2,645,130	68,441	82,382,523	2,897,357

Industries related to the fisheries of the Mississippi River and tributaries

OPERATING UNITS, SALARIES, AND WAGES, 1931

Item	Arkansas	Illinois	Indiana	Iowa	Kentucky	Louisiana	Minnesota and North Dakota
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged	13				11	5	
Vessels, motor	4				2	2	
Net tonnage	69				15	20	
Wholesale and manufacturing:							
Establishments	6	38	4	61	11	22	13
Persons engaged:							
Proprietors	3	42	1	52	8	24	11
Salaried employees	9	3	5	79	20	14	27
Wage earners:							
Average for season	152	331	140	2,500	261	70	112
Average for year	72	235	93	2,179	159	68	112
Paid to salaried employees	$11,417	$9,520	$6,820	$141,346	$33,159	$12,400	$55,200
Paid to wage earners	$53,503	$145,683	$51,444	$1,417,678	$81,643	$37,700	$81,500
Total salaries and wages	$64,920	$155,203	$58,264	$1,559,024	$114,802	$50,100	$136,700
Fishermen manufacturing		4	2			200	

Item	Mississippi	Missouri and Oklahoma	Nebraska and Kansas	Ohio and Pennsylvania	Tennessee	Wisconsin	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged							29
Vessels, motor							8
Net tonnage							104
Wholesale and manufacturing:							
Establishments	6	21	3	13	11	8	217
Persons engaged:							
Proprietors	7	24	3	17	9	3	204
Salaried employees	3	125	8	37	15	10	355
Wage earners:							
Average for season	26	328	52	175	90	38	4,275
Average for year	26	261	52	145	52	29	3,483
Paid to salaried employees	$16,000	$291,874	$17,400	$95,878	$34,884	$12,998	$738,896
Paid to wage earners	$22,382	$202,944	$45,580	$138,817	$38,177	$24,483	$2,341,534
Total salaries and wages	$38,382	$494,818	$62,980	$234,695	$73,061	$37,481	$3,080,430
Fishermen manufacturing	7	3					216

PRODUCTS MANUFACTURED

Item	Indiana		Iowa		Kentucky, Illinois, and Missouri	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Salmon, smoked pounds			240,000	$48,800		
Sturgeon, smoked do			162,000	39,140		
Mussel-shell products:						
Buttons [2] gross			13,698,445	3,139,905		(1)
Poultry feed [2] tons			7,575	59,639		(1)
Lime [2] do			2,524	8,274		(1)
Unclassified [2]				[3] 156,210		[4] $112,808
Unclassified, smoked pounds			[5] 83,000	[5] 14,440		
Total				3,466,408		112,808

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[1] The production of this item is included under unclassified products.
[2] Data are for 1933.
[3] Includes the production of mussel-shell stucco, novelties, and colored shells and chips.
[4] Includes the production of mussel-shell buttons, poultry feed, and lime.
[5] Includes the production of smoked buffalofish and tullibees.

Industries related to the fisheries of the Mississippi River and tributaries—Continued

PRODUCTS MANUFACTURED—Continued

Item	Indiana		Iowa		Kentucky, Illinois, and Missouri	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By fishermen:						
Carp, smoked........pounds..	....	....	....	....	667	$67
Paddlefish roe, salted........do....	450	$180	....	....	900	540
Sheepshead, smoked........do....	....	....	....	....	617	77
Sturgeon:						
Smoked........do....	....	....	....	....	1,333	400
Roe, salted........do....	....	....	....	....	35	32
Total........	450	180	....	....	3,552	1,116
Grand total........	450	180	....	$3,466,408	....	113,924

Item	Louisiana		Minnesota and Nebraska		Mississippi		Tennessee, Ohio, and Pennsylvania	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Salmon, smoked.....pounds..	....	....	(1)	(1)	....	....	(1)	(1)
Sturgeon, smoked......do....	....	....	(1)	(1)	....	....	....	....
Whitefish smoked......do....	....	....	255,000	$47,200	....	....	....	....
Unclassified, smoked.....lbs..	....	....	[6] 66,600	[6] 19,793	....	....	[7] 291,500	[7] $77,205
Total........	....	....	321,600	66,993	....	....	291,500	77,205
By fishermen:								
Alligator hides......pounds..	88,356	$7,363	....	....	....	....	....	....
Paddlefish roe, salted...do....	....	....	....	....	245	$92	....	....
Total........	88,356	7,363	....	....	245	92	....	....
Grand total........	88,356	7,363	321,600	66,993	245	92	291,500	77,205

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[1] The production of this item is included under unclassified products.

[6] Includes the production of smoked eels, salmon, and sturgeon.

[7] Includes the production of smoked buffalofish, butterfish, carp, chubs, lake trout, paddlefish, sablefish, salmon, and tullibees.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of the manufactured products for the States of the Mississippi River and tributaries was as follows: By manufacturing establishments, $3,723,414; and by fishermen, $8,751. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State.

LAKE PEPIN

Fisheries of Lake Pepin, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trot lines	Pound nets	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular........	8	....	....	1	6	9
Casual........	40	14	2	1	20	44
Total........	48	14	2	2	26	53
Boats:						
Motor........	16	7	....	2	17	22
Other........	15	7	2	2	12	23
Apparatus:						
Number........	30	17	2	4	150	....
Length, yards........	4,875	....	....	....	....	....
Square yards........	....	27,000	....	....	....	....
Hooks........	....	....	600	....	....	....

Fisheries of Lake Pepin, 1933—Continued

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	10,300	$206				
Buffalofish	9,700	388	8,000	$320		
Carp	427,000	12,410	80,000	2,400	1,000	$30
Catfish and bullheads	8,450	845			3,000	300
Sheepshead	2,500	100			1,000	40
Sucker "mullet"	31,000	620				
Turtles:						
Snapper	1,000	20			200	4
Soft-shell	500	10				
Total	490,450	14,599	88,000	2,720	5,200	374

Species	Pound nets		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					10,300	$206
Buffalofish	5,000	$200	19,000	$760	41,700	1,668
Carp	25,000	750	102,000	3,060	635,000	18,650
Catfish and bullheads	5,000	500	21,000	2,100	37,450	3,745
Sheepshead			5,500	220	9,000	360
Sucker "mullet"	5,000	100			36,000	720
Turtles:						
Snapper					1,200	24
Soft-shell					500	10
Total	40,000	1,550	147,500	6,140	771,150	25,383

OPERATING UNITS: BY STATES

Item	Minnesota	Wisconsin	Total for lake
	Number	*Number*	*Number*
Fishermen:			
Regular		9	9
Casual	8	36	44
Total	8	45	53
Boats:			
Motor	2	20	22
Other	4	19	23
Apparatus:			
Haul seines	2	28	30
Length, yards	400	4,475	4,875
Gill nets, anchor		17	17
Square yards		27,000	27,000
Lines, trot	2		2
Hooks	600		600
Pound nets		4	4
Fyke nets		150	150

CATCH: BY STATES

Species	Minnesota		Wisconsin		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	500	$10	9,800	$196	10,300	$206
Buffalofish	200	8	41,500	1,660	41,700	1,668
Carp	65,000	1,950	570,000	16,700	635,000	18,650
Catfish and bullheads	3,650	365	33,800	3,380	37,450	3,745
Sheepshead	2,500	100	6,500	260	9,000	360
Sucker "mullet"	1,500	30	34,500	690	36,000	720
Turtles:						
Snapper	200	4	1,000	20	1,200	24
Soft-shell			500	10	500	10
Total	73,550	2,467	697,600	22,916	771,150	25,383

LAKE KEOKUK

Fisheries of Lake Keokuk, 1933

OPERATING UNITS: BY GEAR

Item	Haul seines	Trot lines	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*
Regular	20		23	28
Casual	45	20	62	68
Total	65	20	85	96
Boats:				
Motor	21	5	32	33
Other	32	18	50	54
Apparatus:				
Number	30	60	555	
Length, yards	3,400			
Hooks		18,000		

CATCH: BY GEAR

Species	Haul seines		Trot lines		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,500	$50					2,500	$50
Buffalofish	14,000	555			61,800	$2,422	75,800	2.977
Carp	120,000	3,350	2,000	$50	91,000	2,680	213,000	6,080
Catfish and bullheads	5,000	500	9,000	900	74,500	7,450	88,500	8,850
Sheepshead	24,500	980	1,500	60	61,500	2,460	87,500	3,500
Sturgeon, shovelnose	875	72					875	72
Sucker "mullet"	300	6			1,600	32	1,900	38
Turtles:								
Snapper	5,000	100			150	3	5,150	103
Soft-shell	2,000	40					2,000	40
Total	174,175	5,653	12,500	1,010	290,550	15,047	477,225	21,710

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Total for lake
Fishermen:	*Number*	*Number*	*Number*
Regular	7	21	28
Casual	28	40	68
Total	35	61	96
Boats:			
Motor	12	21	33
Other	22	32	54
Apparatus:			
Haul seines	7	23	30
Length, yards	700	2,700	3,400
Lines, trot	24	36	60
Hooks	7,200	10,800	18,000
Fyke nets	240	315	555

CATCH: BY STATES

Species	Illinois		Iowa		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			2,500	$50	2,500	$50
Buffalofish	9,300	$372	66,500	2,605	75,800	2,977
Carp	76,000	2,280	137,000	3,800	213,000	6,080
Catfish and bullheads	42,700	4,270	45,800	4,580	88,500	8,850
Sheepshead	18,500	740	69,000	2,760	87,500	3,500
Sturgeon, shovelnose			875	72	875	72
Sucker "mullet"	1,000	20	900	18	1,900	38
Turtles:						
Snapper	1,150	23	4,000	80	5,150	103
Soft-shell			2,000	40	2,000	40
Total	148,650	7,705	328,575	14,005	477,225	21,710

MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1933

OPERATING UNITS: By gear

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Dip nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	50	--------	--------	--------	100	22	126
Casual	324	7	32	144	451	50	595
Total	374	7	32	144	551	72	721
Boats:							
Motor	135	7	32	20	330	--------	351
Other	125	--------	--------	126	181	--------	309
Apparatus:							
Number	160	7	32	144	10,960	72	--------
Length, yards	17,600	--------	--------	--------	--------	--------	--------
Square yards	--------	1,400	5,200	--------	--------	--------	--------
Hooks	--------	--------	--------	24,236	--------	--------	--------

CATCH: By gear

Species	Haul seines		Anchor gill nets		Trammel nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	56,000	$1,120	--------	--------	--------	--------	--------	--------
Buffalofish	257,000	10,287	4,000	$160	18,000	$720	--------	--------
Carp	1,346,300	39,864	6,000	180	19,000	570	40,700	$1,329
Catfish and bullheads	43,200	4,290	1,000	100	3,500	350	49,550	4,955
Eels	365	28	--------	--------	--------	--------	350	19
Gizzard shad	1,000	20	--------	--------	--------	--------	--------	--------
Mooneye	500	10	--------	--------	--------	--------	--------	--------
Paddlefish or spoonbill cat	2,950	260	--------	--------	--------	--------	--------	--------
Pike or pickerel	5,750	248	--------	--------	--------	--------	--------	--------
Sheepshead	284,300	11,393	3,500	140	8,500	340	30,250	1,247
Sturgeon, shovelnose	28,700	2,296	2,200	176	19,600	1,568	--------	--------
Sucker "mullet"	129,200	2,668	--------	--------	500	10	--------	--------
Turtles:								
Snapper	16,650	333	--------	--------	--------	--------	--------	--------
Soft-shell	8,500	170	--------	--------	--------	--------	--------	--------
Total	2,180,415	72,987	16,700	756	69,100	3,558	120,850	7,550

Species	Fyke nets		Dip nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	1,500	$30	12,000	$240	69,500	$1,390
Buffalofish	573,600	22,944	50,000	2,000	902,600	36,111
Carp	683,000	20,495	54,000	1,620	2,149,000	64,058
Catfish and bullheads	356,700	35,670	12,500	1,250	466,450	46,615
Eels	--------	--------	--------	--------	715	47
Gizzard shad	--------	--------	--------	--------	1,000	20
Mooneye	--------	--------	--------	--------	500	10
Paddlefish or spoonbill cat	--------	--------	3,000	240	5,950	500
Pike or pickerel	--------	--------	--------	--------	5,750	248
Sheepshead	291,500	11,720	82,000	3,280	700,050	28,120
Sturgeon, shovelnose	--------	--------	12,700	1,016	63,200	5,056
Sucker "mullet"	11,400	220	--------	--------	141,100	2,898
Turtles:						
Snapper	300	6	--------	--------	16,950	339
Soft-shell	--------	--------	--------	--------	8,500	170
Total	1,918,000	91,085	226,200	9,646	4,531,265	185,582

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1933—Con.

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Minnesota	Wisconsin	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	23	85	----------	18	126
Casual	130	260	73	132	595
Total	153	345	73	150	721
Boats:					
Motor	73	153	28	97	351
Other	81	128	45	55	309
Apparatus:					
Haul seines	29	72	17	42	160
Length, yards	3,150	8,000	2,250	4,200	17,600
Gill nets	----------	----------	----------	7	7
Square yards	----------	----------	----------	1,400	1,400
Trammel nets	----------	24	----------	8	32
Square yards	----------	4,133	----------	1,067	5,200
Lines, trot	38	49	45	12	144
Hooks	5,800	8,700	8,136	1,600	24,236
Fyke nets	2,145	5,775	360	2,680	10,960
Dip nets	----------	72	----------	----------	72

CATCH: BY STATES

Species	Illinois		Iowa		Minnesota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	2,500	$50	27,800	$556	4,500	$90
Buffalofish	166,800	6,672	445,200	17,808	42,800	1,719
Carp	351,600	10,583	919,700	27,640	230,400	6,466
Catfish and bullheads	107,950	10,795	231,650	23,165	38,100	3,780
Eels	----------	--------	715	47	----------	--------
Gizzard shad	----------	--------	1,000	20	----------	--------
Mooneye	----------	--------	----------	--------	500	10
Paddlefish or spoonbill cat	500	40	5,250	440	----------	--------
Pike or pickerel	----------	--------	5,550	240	----------	--------
Sheepshead	131,500	5,350	351,750	14,070	47,800	1,940
Sturgeon, shovelnose	10,200	816	41,500	3,320	3,000	240
Sucker "mullet"	7,000	134	47,600	1,034	31,700	634
Turtles:						
Snapper	1,600	32	4,000	80	2,400	48
Soft-shell	500	10	2,750	55	----------	--------
Total	780,150	34,482	2,084,465	88,475	401,200	14,927

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1933—Con.

CATCH: BY STATES—Continued

Species	Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*
Bowfin	34,700	$694	69,500	$1,390
Buffalofish	247,800	9,912	902,600	36,111
Carp	647,300	19,369	2,149,000	64,058
Catfish and bullheads	88,750	8,875	466,450	46,615
Eels			715	47
Gizzard shad			1,000	20
Mooneye			500	10
Paddlefish or spoonbill cat	200	20	5,950	500
Pike or pickerel	200	8	5,750	248
Sheepshead	169,000	6,760	700,050	28,120
Sturgeon, shovelnose	8,500	680	63,200	5,056
Sucker "mullet"	54,800	1,096	141,100	2,898
Turtles:				
Snapper	8,950	179	16,950	339
Soft-shell	5,250	105	8,500	170
Total	1,265,450	47,698	4,531,265	185,582

FISHERIES OF ALASKA [14]

The commercial catch of fishery products in Alaska during 1933, exclusive of whales, amounted to 627,395,274 pounds, valued at $9,088,984, which is an increase of 5 percent in volume and 30 percent in value as compared with the catch in 1932. Of the total catch in 1933, 467,348,858 pounds, valued at $7,498,037, consisted of salmon; 157,337,810 pounds, valued at $1,443,414, other fish; and 2,708,606 pounds, valued at $147,533, shellfish. In addition, 182 whales were taken. These fisheries gave employment to 8,656 fishermen, 1,283 persons on transporting craft, and 11,756 persons in fisheries wholesale and manufacturing industries—a total of 21,695 persons, which is an increase of 8 percent as compared with the number employed in 1932.

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[14] Statistics for the fisheries of Alaska are collected and compiled by the Alaska Division of this Bureau. A summary of these statistics appear in this section. For detailed figures the reader is referred to "Alaska Fisheries and Fur-Seal Industries in 1933" by Ward T. Bower, Appendix II to the Report of Commissioner of Fisheries for the fiscal year 1934.

Fisheries of Alaska, 1933

SUMMARY: BY DISTRICTS

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	*Value*	*Number*	*Value*	*Number*	*Value*	*Number*	*Value*
PERSONS ENGAGED								
In fishing	3,879		1,888		2,889		8,656	
In transporting	537		395		351		1,283	
In wholesale and manufacturing industries	4,742		3,131		3,883		11,756	
Total	9,158		5,414		7,123		21,695	
CRAFT EMPLOYED								
Vessels fishing	460		41		6		507	
Boats fishing	1,896		1,014		1,308		4,218	
Vessels transporting	121		93		78		292	
Scows, houseboats, pile drivers, etc	234		197		187		618	
Total	2,711		1,345		1,579		5,635	
CATCH								
Fish:	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	169,461,046	$2,671,835	128,249,502	$2,013,780	169,638,310	$2,812,422	467,348,858	$7,498,037
Other	117,921,514	1,242,270	35,569,663	181,531	3,846,633	19,613	157,337,810	1,443,414
Shellfish	974,187	48,305	1,734,419	99,228			2,708,606	147,533
Total	288,356,747	3,962,410	165,553,584	2,294,539	173,484,943	2,832,035	627,395,274	9,088,984
	Number		*Number*		*Number*		*Number*	
Whales			182				182	
WHOLESALE AND MANUFACTURING								
Establishments	79		97		48		224	
PRODUCTS AS PREPARED FOR MARKET	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	109,650,847	10,477,788	72,156,995	7,897,181	81,432,367	11,029,103	263,240,209	29,404,072
Herring	44,173,201	806,062	16,705,660	490,837	2,417,315	105,295	63,296,176	1,402,194
Halibut	14,046,850	724,572	22,061	1,790			14,068,911	726,362
Cod			251,665	9,757	86,810	3,150	338,475	12,907
Trout	37,355	1,815	3,000	150			40,355	1,965
Sablefish	103,095	4,505					103,095	4,505
Smelt			500	50			500	50
Flounder	75,000	1,125					75,000	1,125
Rockfish	3,533	119					3,533	119
Clam	1,992	361	521,028	245,977			523,020	246,338
Shrimp	309,092	100,340	9,960	2,042			319,052	102,382
Crab	219,154	56,331	351,542	99,249			570,696	155,580
Whale			3,378,125	68,989			3,378,125	68,989
Total	168,620,119	12,173,018	93,400,536	8,816,022	83,936,492	11,137,548	345,957,147	32,126,588

Fisheries of Alaska, 1933—Continued

OPERATING UNITS: BY DISTRICTS

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Fishermen	3,879	1,888	2,889	8,656
Vessels fishing:				
Steam	----	3	----	3
Net tonnage	----	217	----	217
Motor	460	38	6	504
Net tonnage	6,347	828	195	7,370
Boats fishing:				
Motor	731	250	51	1,032
Other	1,165	764	1,257	3,186
Apparatus:				
Traps	261	138	1	400
Purse seines	357	82	6	445
Yards	115,794	18,216	2,850	136,860
Haul seines	3	96	3	102
Yards	600	19,374	230	20,204
Apparatus—Continued:				
Gill nets	265	957	2,124	3,346
Yards	49,250	88,900	313,662	451,812
Beam trawls	10	1	----	11
Wheels	----	----	280	280
Lines:				
Hand lines (cod fishery)	----	33	27	60
Trawl lines (cod fishery)	----	6	7	13
Troll lines (salmon fishery)	3,047	----	----	3,047
Skates of lines (halibut fishery)	2,341	----	----	2,341
Crab pots	732	260	----	992
Herring pounds	4	12	----	16
Herring pound seines	8	8	----	16

CATCH: BY DISTRICTS

[Estimated round weight and value to fishermen]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH								
Salmon:								
Blueback, red or sockeye	7,073,220	$146,631	44,521,582	$857,244	157,730,300	$2,745,537	209,325,102	$3,749,412
Chinook or king	8,543,780	194,853	1,914,780	47,075	1,716,300	21,744	12,174,860	263,672
Chum or keta	40,926,618	442,409	20,046,636	221,520	10,056,726	43,208	71,029,980	707,137
Humpback or pink	103,132,780	1,718,786	55,956,760	803,225	112	3	159,089,652	2,522,014
Silver or coho	9,784,648	169,156	5,809,744	84,716	134,872	1,930	15,729,264	255,802
Herring	102,026,831	510,134	34,945,643	174,728	3,607,933	18,040	140,580,407	702,902
Halibut	15,607,611	724,572	24,512	1,790	----	----	15,632,123	726,362
Cod	----	----	589,383	4,813	238,700	1,573	828,083	6,386
Trout:								
Dolly Varden	35,109	1,391	9,375	150	----	----	44,484	1,541
Steelhead	11,585	424	----	----	----	----	11,585	424
Sablefish	151,610	4,505	----	----	----	----	151,610	4,505
Smelt	----	----	750	50	----	----	750	50

Flounders	83,333	1,125					83,333	1,125
Rockfishes	5,435	119					5,435	119
Total	287,382,560	3,914,105	163,819,165	2,195,311	173,484,943	2,832,035	624,686,668	8,941,451
SHELLFISH								
Crabs	408,218	28,165	674,374	49,625			1,082,592	77,790
Shrimp	561,985	20,068	18,109	408			580,094	20,476
Clams:								
Butter	3,984	72					3,984	72
Razor			1,041,936	49,195			1,041,936	49,195
Total	974,187	48,305	1,734,419	99,228			2,708,606	147,533
Grand total	288,356,747	3,962,410	165,553,584	2,294,539	173,484,943	2,832,035	627,395,274	9,088,984

NOTE.—In addition to the above, 182 whales were taken in Alaskan waters. The round weight and value to the fishermen cannot be determined, but the products amounted to 3,378,125 pounds, valued at $68,989.

Industries related to the fisheries of Alaska, 1933

TRANSPORTING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total	Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*		*Number*	*Number*	*Number*	*Number*
Persons engaged	537	395	351	1,283	Vessels transporting—Continued:				
Vessels transporting:					Motor	121	92	69	282
Steam		1	9	10	Net tonnage	3,556	2,919	4,507	10,982
Net tonnage		1,724	16,643	18,367	Scows, houseboats, pile drivers, etc	234	197	187	618

Industries related to the fisheries of Alaska, 1933—Continued

WHOLESALE AND MANUFACTURING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	4,742	3,131	3,883	11,756
Establishments:				
Handling fresh and frozen fish	39	3		42
Curing fish	31	57	36	124
Canning fish	42	43	23	108
Manufacturing by-products	7	5		12
Total (exclusive of duplication)	79	97	48	224

PRODUCTS AS PREPARED FOR MARKET

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
FRESH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon (for food)	559,287	$30,601					559,287	$30,601
Salmon (for bait)	48,700	277	15,300	$100			64,000	377
Herring (for bait)	2,413,220	21,232	562,300	5,014			2,975,520	26,246
Halibut	8,260,476	415,833	22,061	1,790			8,282,537	417,623
Trout	27,822	1,377	1,500	120			29,322	1,497
Sablefish	8,990	271					8,990	271
Smelt			500	50			500	50
Flounders	75,000	1,125					75,000	1,125
Rockfishes	428	10					428	10
Crabs:								
Meat	62,968	15,923	27,392	3,711			90,360	19,634
Whole in shell	30,090	665	28,710	951			58,800	1,616
Clams, whole in shell			120	25			120	25
Shrimp:								
Meat	307,552	100,109	9,460	1,992			317,012	102,101
Whole in shell	1,540	231	500	50			2,040	281
Total	11,796,073	587,654	667,843	13,803			12,463,916	601,457
FROZEN								
Salmon (for food)	4,236,252	221,382					4,236,252	221,382
Herring (for bait)	1,496,370	12,263					1,496,370	12,263
Halibut	5,786,374	308,739					5,786,374	308,739
Trout	9,533	438					9,533	438

Sablefish	92,705	4,134					92,705	4,134
Rockfishes	3,105	109					3,105	109
Total	11,624,339	547,065					11,624,339	547,065
CURED								
Salmon:								
Mild-cured	3,817,600	612,393			105,600	$10,435	3,923,200	622,828
Pickled	14,000	926	342,450	27,108	678,500	45,886	1,034,950	73,920
Dried and dry-salted			31,425	641	1,368,107	54,640	1,399,532	55,281
Herring:								
Pickled (for food):								
Scotch-cure	3,874,703	174,284	7,177,000	338,065	1,599,625	73,982	12,651,328	586,331
Norwegian-cure	31,250	1,750	6,000	450	253,700	11,819	290,950	14,019
Roused					509,790	17,474	509,790	17,474
Spiced	1,000	125					1,000	125
Dry-salted					54,200	2,020	54,200	2,020
Cod:								
Dry-salted			36,620	1,067	45,810	1,350	82,430	2,417
Pickled			186,425	5,865	38,000	1,500	224,425	7,365
Stockfish			28,220	2,785	3,000	300	31,220	3,085
Tongues			400	40			400	40
Trout, dried			1,500	30			1,500	30
Sablefish, pickled	1,400	100					1,400	100
Total	7,739,953	789,578	7,810,040	376,051	4,656,332	219,406	20,206,325	1,385,035
CANNED								
Salmon:								
Blueback, red or sockeye	3,894,048	573,847	23,255,232	3,336,299	77,504,304	10,723,142	104,653,584	14,633,288
Chinook or king	391,008	58,395	1,141,728	180,633	455,088	72,154	1,987,824	311,182
Chum or keta	20,393,328	1,729,485	9,978,192	868,067	1,250,352	115,254	31,621,872	2,712,806
Humpback or pink	70,944,624	6,729,582	33,817,824	3,144,137			104,762,448	9,873,719
Silver or coho	4,598,640	507,480	3,134,736	330,022	69,888	7,517	7,803,264	845,019
Miscellaneous fish	3,360	520	9,000	2,647	528	75	12,888	3,242
Clams	1,992	361	520,908	245,952			522,900	246,313
Crabs	126,096	39,743	295,440	94,587			421,536	134,330
Total	100,353,096	9,639,413	72,153,060	8,202,344	79,280,160	10,918,142	251,786,316	28,759,899
BYPRODUCTS								
Fertilizer:								
Salmon	600,000	9,900	313,358	4,779			913,358	14,679
Whale			1,034,000	13,773			1,034,000	13,773
Meal, herring	17,534,860	277,611	4,496,000	71,911			22,030,860	349,522
Oil:								
Salmon	150,000	3,000	117,750	2,748			267,750	5,748
Herring	18,821,798	318,797	4,464,360	75,397			23,286,158	394,194
Whale			2,260,125	53,066			2,260,125	53,066
Sperm			84,000	2,150			84,000	2,150
Total	37,106,658	609,308	12,769,593	223,824			49,876,251	833,132
Grand total	168,620,119	12,173,018	93,400,536	8,816,022	83,936,492	11,137,548	345,957,147	32,126,588

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than Alaska ports. The total landings in Alaska in 1933 amounted to 6,779,768 pounds, valued at $316,310 as compared with 4,562,988 pounds, valued at $134,652, in 1932.

Supplementary table showing the pack of canned products in "Standard cases" [1]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Salmon:								
Blueback, red or sockeye	81, 126	$573, 847	484, 484	$3, 336, 299	1, 614, 673	$10, 723, 142	2, 180, 283	$14, 633, 288
Chinook or king	8, 146	58, 395	23, 786	180, 633	9, 481	72, 154	41, 413	311, 182
Chum or keta	424, 861	1, 729, 485	207, 879	868, 067	26, 049	115, 254	658, 789	2, 712, 806
Humpback or pink	1, 478, 013	6, 729, 582	704, 538	3, 144, 137			2, 182, 551	9, 873, 719
Silver or coho	95, 805	507, 480	65, 307	330, 022	1, 456	7, 517	162, 568	845, 019
Miscellaneous fish	70	520	187	2, 647	11	75	268	3, 242
Clams	133	361	34, 727	245, 952			34, 860	246, 313
Crabs	2, 627	39, 743	6, 155	94, 587			8, 782	134, 330
Total	2, 090, 781	9, 639, 413	1, 527, 063	8, 202, 344	1, 651, 670	10, 918, 142	5, 269, 514	28, 759, 899

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[1] The pack of salmon, miscellaneous fish, and crabs has been converted to "standard cases" of forty-eight 1-pound cans, and clams to "standard cases" of 48 no. 1, 5-ounce cans.

Supplementary table showing the output of byproducts in tons and gallons

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fertilizer:								
Salmon tons	300	$9, 900	157	$4, 779			457	$14, 679
Whale do			517	13, 773			517	13, 773
Meal, herring do	8, 767	277, 611	2, 248	71, 911			11, 015	349, 522
Oil:								
Salmon gallons	20, 000	3, 000	15, 700	2, 748			35, 700	5, 748
Herring do	2, 509, 573	318, 797	595, 248	75, 397			3, 104, 821	394, 194
Whale do			301, 350	53, 066			301, 350	53, 066
Sperm do			11, 200	2, 150			11, 200	2, 150
Total		609, 308		223, 824				833, 132

STATISTICAL SURVEY PROCEDURE

In order that those who use the statistical data contained in this report and previous reports of the Division of Fishery Industries may be informed as to the source of the figures and methods for their collection, it has been deemed advisable to outline in considerable detail the statistical survey procedure followed by the Division. This procedure has been developed over a period of years, and changes in method have been made at times where such changes have appeared to work toward general improvement. While the surveys in the several sections are not made in the same manner owing to varying facilities and records in different States, an attempt has been made to make the data collected by various methods in the producing areas comparable with respect to the same year as well as over a period of years. Throughout the entire plan it has been the intention to coordinate State and Federal fishery statistical work so that there will be as little duplication of effort as possible. The procedure will be discussed under two main heads—"Sectional surveys" and "Local and special surveys".

SECTIONAL SURVEYS

Statistical surveys of the fisheries and fishery industries of the various sections of the United States occupy by far the greatest part of the time of the statistical personnel of the Division. It is in the course of these surveys that the statistical and marketing agents visit the individual fishing localities of the various States to collect statistics of the volume of the catch of fish and its value, employment in fishing, quantity of fishing gear, number and classification of fishing and transporting craft, employment in wholesale and manufacturing establishments, and the volume and value of manufactured fishery products and byproducts. The various phases of these surveys are discussed in detail in the sections following.

History.—The first comprehensive statistical survey of the fisheries and fishery industries of the United States was made for the year 1880 by George Brown Goode, Assistant Director of the U. S. National Museum and associates, with the cooperation of the Commissioner of Fisheries and the Superintendent of the Tenth Census. Data for specific fisheries or restricted sections for years prior to 1880 were also collected in this early survey and recorded in Mr. Goode's reports. The survey for 1880, however, did not include the Mississippi River and tributaries. Periodic general surveys of a limited number of States or limited areas of the United States were made for various of the intervening years between 1880 and 1908 and from 1909 to 1928. In 1908 a survey of the entire United States was made. The next general survey of the entire United States was not made until 1931 although complete data for all sections excluding the Mississippi River and tributaries were collected for 1929 and 1930 and complete data on the catch and operating units of the fisheries were collected for 1932. In the latter survey, however, lack of sufficient funds prohibited collection of data on wholesale and manufacturing firms except those data collected as a part of the canned fishery products and byproducts surveys. In 1933 a complete general canvass was made of the New England, Middle Atlantic, Chesapeake, and Pacific States.

Following is a summary indicating the years for which statistics were collected on the fisheries and fishery industries in the various sections. Figures for the more recent years are available for free distribution from the Bureau in bulletin form, but figures for the earlier years are available only in the various printed reports of the Bureau. These reports are available for reference in the Bureau's library and at many public libraries.

In the New England States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1889, 1898, 1902, 1905, 1908, 1919, 1924, 1928, 1929, 1930, 1931, 1932, and 1933. For most of these years data on operating units and wholesale and manufacturing trade also were collected. In addition to the above, a partial statistical survey was made for the entire section in 1892; a partial survey of the fisheries in Maine, New Hampshire, and Massachusetts for the fiscal year 1897; the lobster fishery for 1900 and 1913; the oyster fishery for 1910; the shad and alewife fisheries for 1896; the menhaden industry for 1912; the fisheries of Massachusetts for 1879; and the fisheries of Connecticut for 1925 and 1926.

Statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of the Middle Atlantic States were collected for the years 1880, 1887, 1888, 1889, 1890, 1891, 1897, 1898, 1901, 1904, 1908, 1921, 1926, 1929, 1930, 1931, 1932, and 1933. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to these a statistical survey was made of the coastal fisheries of these States in 1915; catch in all States except New York, in 1892; the shad and alewife fisheries in 1896; the shad fisheries of the Delaware River in 1910; the shad fisheries of the Chesapeake Bay and tributaries in 1909; the menhaden industry in 1912; the lobster fisheries in 1900 and 1913; and the oyster fishery in 1911. The years for which statistics are available on the shad fishery of the Hudson River are given in the section entitled "Shad and alewife fisheries".

In the Chesapeake Bay States statistics on the catch of the marine fisheries and those conducted in coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1890, 1891, 1897, 1901, 1904, 1908, 1920, 1925, 1929, 1930, 1931, 1932, and 1933. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the crab fishery for 1915; the oyster fishery and menhaden industry for 1912; and the shad and alewife fisheries for 1896, 1909, and 1915. The years for which statistics of the shad and alewife fisheries of the Potomac River are available are given in the section entitled "Shad and alewife fisheries".

In the South Atlantic and Gulf States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1889, 1890, 1897, 1902, 1908, 1918, 1923, 1927, 1928, 1929, 1930, 1931, and 1932. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the fisheries of these States, excluding Florida and Alabama, for 1887; the shad fishery of the South Atlantic States for 1910; the shad and alewife fisheries of the South Atlantic States for 1896; the sturgeon fishery of Florida for 1900; the menhaden industry of the South Atlantic States for 1912; the shrimp fishery for 1916; the oyster fishery of the South Atlantic States for 1910; and the oyster fishery of the Gulf States for 1911.

In the Pacific Coast States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1892, 1895, 1899, 1904, 1908, 1915, and for all the years from 1922 to 1933, inclusive. These surveys have usually included data on operating units and wholesale and manufacturing trade. In addition to the above, statistics were obtained on the fisheries of California from 1918 to 1921, inclusive, and for the oyster fishery in 1912.

Statistics on the catch of the fisheries of the Great Lakes were collected for the years 1880, 1885, 1890, 1893, 1899, 1903, 1908, and for all the years from 1913 to 1932, inclusive. Statistics of the operating units and of the wholesale and manufacturing trade were collected for most of the years when canvasses were made from 1880 to 1908 and in 1917 and 1922 as well as in most of the years from 1926 to 1932, inclusive. In addition to the above a survey was made of the fisheries of Lake Ontario and of certain fisheries in other lakes for the year 1897.

Statistics of the catch of the fisheries of the Mississippi River and its tributaries were collected for the years 1894, 1899, 1903, 1908, 1922, and 1931. In addition figures have been obtained of the fisheries of Lakes Pepin and Keokuk for the years 1914 and 1917 and the years from 1927 to 1933, inclusive, and of the fisheries of the Mississippi River between Lakes Pepin and Keokuk for the years 1929 to 1933, inclusive.

Statistics also were collected on the fisheries of certain interior waters, other than the fisheries of the Great Lakes and the Mississippi River and its tributaries, for the years 1894, 1895, 1900, and 1902.

Statistical agents.—The statistics contained in this volume have been collected by a corps of trained statistical and marketing agents which comprises a part of the permanent staff of the Division of Fishery Industries of the Bureau. Most of these men have been with the Bureau for a period of 5 years or more. In the main they are college graduates and were recruited through civil-service examination. While in college, most of the men pursued biological or technical courses largely in fishery work which has especially suited them for coping with the many biological and technical aspects encountered in canvassing the fisheries. This training has been especially helpful in identification of the species which, because of the many local names applied to a particular species, causes considerable confusion.

Period covered.—In conducting the fishery statistical surveys, agents are dispatched to the districts to be surveyed as early in the calendar year as they can be spared from the tabulation and preparation for publication of their previous season's work. They collect statistics of fishery operations for the year preceding that in which they are working; and, since their field work occupies the greater part of the year, it is usually at least a year from the end of the calendar year for which they are collecting data until the figures are published. Most of the figures are collected for the calendar year. Where there are variations from this general practice, explanatory notes appear in the tables. Prior to 1930, statistics on the catch of oysters in the Atlantic and Gulf States were collected for the oyster season; that is, from September to

April, inclusive. Beginning with 1930 and down to the present, they have been collected on the basis of the calendar year.

Scope.—The scope of the coastal statistical surveys includes canvasses of the commercial fisheries of the oceans and bays and of the coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River cover canvasses of the fisheries of the Mississippi River proper as well as all of its tributaries wherein commercial fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the fisheries of the Great Lakes cover canvasses of the fisheries prosecuted in the Lakes proper, adjacent bays, and the international lakes of northern Minnesota, as well as rivers which sustain a commercial fishery having outlets into these waters. Surveys for statistics of the wholesale and manufacturing fishery industries cover such plants located in the coastal, river, and lake areas adjacent to the waters mentioned above.

Methods of collection.—Several methods for the collection of fishery statistics are employed, each of which has been carefully studied to obtain the best results with the available personnel and funds. In most instances the agents obtain lists of the names of fishing vessels, names or numbers of motor boats, and names of owners of these craft from local customs officials. Also it often is possible to obtain the names of licensed commercial fishermen and occasionally some statistics on the catch from several of the State fishery agencies, from other State, county, or city agencies, or from private organizations.

With such preliminary records as are available for their guidance the agents then visit each fishing community in their field unless their preliminary records are so complete that personal visits in some areas may be eliminated. While it is impossible for the few agents available for this work to interview each fisherman in a given locality, the more important ones are visited and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice virtually all wholesale firms are visited as well as captains of fishing vessels (those of 5 net tons or over) and also most of the more important inshore fishermen.

In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained in recent years from the State fishery agencies in the collection of statistics that only fragmentary surveys need be made by the Bureau's agents to obtain the necessary data. Also the State fishery agencies in Maryland and Virginia recently have developed very complete statistical systems which greatly facilitate the Bureau's canvasses in these States.

As regards the fisheries of the Great Lakes and international lakes of northern Minnesota the Bureau obtains most of the catch statistics and usually the value of the catch direct from the records of the State fishery agency. To obtain data on the number of fishermen, boats, vessels, and gear the Bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records.

Bureau agents are stationed at Seattle, Wash., and Terminal Island, Calif., who survey the fisheries of the Pacific Coast States. As a rule they obtain figures on the volume of the catch from the records of the several State fishery agencies. In most cases the value of the catch is derived from dealers' records and sometimes from estimates of prices. In Washington and Oregon the offshore fisheries are surveyed separately by the Bureau's agent to obtain the number of operating units, catch, and value of the catch. Statistics of the wholesale fishery industry for this section are obtained largely by personal interviews of the agents.

In the administration of the Alaska fisheries the Bureau obtains sworn statements concerning their activities from those prosecuting the fisheries in this area. These statements are compiled by the Alaska Division of this Bureau.

Statistics of the volume of the catch of fish of the Pacific Coast States are usually shown in weights as landed which may be in the round or dressed condition. Statistics on the volume of the catch of fish taken in the remainder of the United States are shown in round weight.

The figures in the tables for shellfish represent the weight of the meats in the case of univalve and bivalve mollusks and gastropods, and the round weight of crustaceans and such mollusks as squid and octupus.

Shore and vessel fisheries.—In general statistics of the shore fisheries as collected by the agents include data on the number of casual and regular fishermen; number and tonnage of motor and other fishing boats and accessory boats; kind and quantity of gear used, and the volume, value, and method of capture of each species caught by boats (for our purpose craft of less than 5 net tons capacity are called "boats") for each locality or group of localities. This method is not followed in some sections where the availability of data collected by the State fishery agencies obviates the necessity of detailed locality surveys.

Statistics of the vessel fisheries include data on the number of the crew, rig of vessel, net tonnage, kind and quantity of gear used, accessory boats carried and volume, value, and method of capture of each species caught by each vessel (for our purpose craft of 5 net tons capacity or more are called "vessels"). As in the shore fisheries the availability of figures collected by State fishery agencies may eliminate the necessity of our agents collecting these data for each vessel.

All persons engaged in commercial fishing operations are included as fishermen. For our purpose these have been divided into "regular" and "casual" fishermen. Regular fishermen are those who receive more than one-half of their annual income from fishing; and casual fishermen are those whose principal business is something other than fishing, and who receive less than one-half of their annual compensation from fishing.

The catch of fish is credited to the principal port of arrival and departure of the craft rather than its point of ownership, registration, documentation, or its port of landing. This accounts for catches of fish being shown in areas where they are not common since fishing vessels frequently fish in areas far from their principal fishing port.

Wholesale and manufacturing trade.—All persons or firms engaged in the wholesale buying and selling of fishery products or who produce manufactured fishery products are surveyed under this title. Where the business of fishing and wholesaling or manufacturing is combined, that part of the business devoted to either of the latter two phases is included in the wholesale and manufacturing survey and the part devoted to fishing is included in the shore or vessel fisheries. If a wholesale business is conducted with no manufacturing and the business is so small that the full time of one man over the whole year or season is not required, it is then disregarded as a wholesale business. If commodities other than fishery products are handled the persons engaged, and salaries and wages paid, are prorated; and only that part concerned with fishery products is included. If such a firm requires less than the full time of one man over the whole year or season and if it does not manufacture, it is not included in the canvass. Retail firms that manufacture or whose wholesale business exceeds the retail part are included. Persons or firms engaged in the motor trucking of fishery products are included as wholesalers if they are engaged in wholesale buying and selling.

Buyers for a central firm are not canvassed as wholesale dealers unless they ship direct to the firms' customers from the buying point.

Fishermen or fishing concerns, except manufacturers, who do not buy fishery products are not included under this heading except that oyster-shucking firms are included provided shuckers are employed and irrespective of whether all or part of the oysters used are taken from the firms' privately owned beds.

Manufacturing concerns include those which prepare packaged fishery products; salted, spiced, smoked, dried, or otherwise cured fishery products; canned fishery products; or fishery byproducts.

Fishermen who manufacture are surveyed to obtain the number of persons so employed and the volume and value of the products prepared.

In collecting statistics of manufacturing firms the agents obtain data on the production for each plant in producing areas of products as marketed by the plant. Such products are usually "final" and in form for consumption; however, the products may be "intermediate" and require further processing before reaching the consumer markets. An outstanding example of an intermediate product is green-salted ground fish which almost invariably is further processed before final marketing. In reviewing the statistics of manufactured products it should be observed that intermediate products are not shown where they are prepared to the final stage in the original plant. An exception to this rule, however, is in the case of the production of mild-cured salmon which on account of its importance is shown in its entirety whether further processed in the producing plant or not. In this connection it should also be stated that several of the byproducts for which statistics are shown may be intermediate and the plants producing the final product are not surveyed by this Bureau. Outstanding among such products are marine-animal oils and fish scrap and meal.

Statistics of persons engaged in wholesale and manufacturing establishments are reported in three groups: Proprietors, salaried employees, and wage earners.

Proprietors represent those persons who devote their time to the conduct of the enterprise and receive their compensation in the form of profits. Managers of branch houses are not classified as proprietors.

Salaried employees usually include those persons paid by the week or month while wage earners usually consist of those paid on a per diem or piece-work basis. This, however, is not true in all cases, since the distinction between these two classes depends primarily on the character of the work done rather than the unit of time employed for calculating rates of pay. In general, office employees are classified as salaried employees. Other employees, including plant workmen, are classed as wage earners. Plant foremen or superintendents are classified as salaried employees unless they are principally engaged in manual labor, in which case they are classified as wage earners. Active officers of corporations are classified as salaried employees. Statistics of wage earners are shown in two forms: The average number employed during the operating season; and the average number employed during the year (the monthly average for the year).

Transporting trade.—Statistics are obtained on the number of the crew and number of boats and vessels engaged in transporting fishery products from the fishing grounds to port or from port to port. However, if a craft is engaged in catching fish at any time of the year it is included as a fishing craft rather than as a transporter.

Publication of data.—Statistics of employment in the fisheries, craft and gear engaged, catch and value of catch, and certain data on industries related to the fisheries are summarized and published in bulletin form as soon as possible after completion of each survey. Later the figures in more detail are included in the annual reports of the Division.

LOCAL AND SPECIAL SURVEYS

Landings at certain important United States ports.—Statistics of the landings of aquatic products at the principal New England ports (Boston and Gloucester, Mass., and Portland, Maine) are obtained in a similar manner. An agent is permanently stationed at each of these ports. His duties include the obtaining of figures daily on the quantity of fish landed by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and he also indicates the grounds from which the fish were taken and gear used in their capture. These data are forwarded the Bureau, where compilations are made. Products of American fisheries received duty free at Boston and Gloucester, Mass., and Portland, Maine, from the treaty coasts of Newfoundland, Magdalen Islands, and Labrador are included in the landings at these ports; however, they are not included in the catch in sectional fishery surveys of the New England States unless they represent a catch by United States vessels. Statistics of these landings are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Data on the landings at Boston and Gloucester, Mass., have been collected annually since 1893, and those for Portland, Maine, since June 1915. Some data are available for Boston and Gloucester prior to 1893.

Statistics of the landings of fish at Seattle, Wash., are collected by the Bureau's agent in that city. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries collected mainly from points in Puget Sound and do not include fish received from Alaska or Canada, or landings made by the halibut fleet. Statistics of these landings at Seattle are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Statistics of the landings by fishing vessels at Seattle have been collected since June 1915 and certain data on products received by Seattle wholesale dealers since December 1915.

Statistics on the landings of fish at New York City are obtained from J. H. Matthews, executive secretary of the Middle Atlantic Fisheries Association, New York, N. Y. During the years when one of the large trawling companies operated from Groton, Conn., the landings at that port were collected by the Bureau's agents and included with the landings at New York City in published data. Monthly bulletins including these landings are not issued. However, a summary of the year's activities is published in the annual reports of the Division. Statistics of the landings at either one or both of the above ports are available since 1922.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department in Washington. They are not published in bulletin form, but a summary of the year's activities is published in the annual reports of the Division. Data on products handled at the municipal wharf are available since 1921.

Atlantic mackerel fishery.—Statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Maine, with those obtained by Bureau agents, who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on the volume of mackerel landed in a manner similar to that used to obtain figures on the landings by fishing vessels at the three New England ports. The figures include only the catches made by purse seine and drift gill net craft and are not complete for craft of under 5 net tons capacity using this type of gear. Statistics of this fishery appear only in the annual reports of this Division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports. Statistics of this fishery are available from 1905 to 1933, inclusive.

Shad and alewife fisheries.—Owing to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery.

The survey in the Potomac River is conducted entirely by Bureau agents in a manner similar to that employed in the collection of the usual fishery statistics. The survey of the Hudson River shad fishery also is conducted by Bureau agents although considerable data is obtained from the New York State fishery agency for the catch in waters of this State.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual reports of the division.

Statistics of the shad fishery of the Hudson River are available for 1896, 1897, 1898, 1901, 1904, 1910, and from 1915 to 1933, inclusive, while data for the shad fishery of the Potomac River are available for 1896, 1901, 1904, 1909, 1915, and from 1919 to 1933, inclusive. Statistics of the alewife fishery of the Potomac River are available for 1896, 1909, 1915, and from 1919 to 1933, inclusive.

Pacific halibut fishery.—Statistics of the Pacific halibut fishery are obtained by the Bureau's agent in Seattle, aided by Bureau representatives in Alaska and the International Fisheries Commission. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all United States and Alaska vessels that land more than half of their catch in that State. All other United States and Alaska vessels of the halibut fleet are included in the "Alaska fleet." Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash., and detailed statistics are published in the annual reports of the Division. Statistics of the landings of halibut at Pacific coast ports have been collected since 1925.

Canned fishery products and byproducts.—Beginning in 1921, the Bureau has made annual surveys for statistics of the canned fishery products and byproducts industries of every section. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys usually occupy 6 to 9 week's time. During this period the Bureau obtains by mail, so far as possible, the production of canned fishery products or byproducts from each plant in the United States engaged in this business. Where it is impossible to obtain reports by mail the report is obtained by personal visit by the Bureau's agents. They obtain statistics of the production and value of the production for each commodity. Statistics of the canned fishery products and byproducts produced in Alaska are received on the same statements obtained by the Bureau that include statistics of their general fishery operations.

An annual statistical bulletin is issued on this trade, and detailed statistics of the output are published in the annual reports of the Division. In addition to the data obtained on the output of these products annually since 1921, data also usually were obtained prior to 1921 for the years the various sections were surveyed.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commission or expenses.

Packaged-fish trade.—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for the statistics of the canned fishery products and byproducts industries. These statistics are released in bulletin form annually and detailed statistics are published in the annual reports of the Division. Statistics of the production of packaged fish are available for 1926 and the years from 1928 to 1933, inclusive.

Cold-storage holdings of fish.—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this Bureau monthly. Included with statistics of the holdings are statements of the quantity of the various species of fish frozen and also the holdings of certain cured fish. Bulletins showing these statistics are issued monthly as well as annually, and detailed statistics are published in the annual reports of this Division. Statistics of cold-storage holdings of fishery products have been published since 1917 and data on quantities of fish frozen, for the years from 1920 to 1925, inclusive, and from 1928 to 1933, inclusive.

Sponge market, Tarpon Springs.—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the Bureau has obtained from a representative of the exchange annual statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this Division. Statistics of the transactions on the sponge exchange are available for 1913, 1914, and for the years from 1917 to 1933, inclusive.

Foreign fishery trade.—Statistics of the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Statistics of all known fishery products imported or exported have been assembled in one table and published annually in the reports of the Division in recent years. For earlier years they are available in the reports of the Bureau of Foreign and Domestic Commerce, the Bureau of Statistics, the Department of Commerce and Labor, and the Treasury Department.

PRACTICES AND TERMS

Certain practices and terms of importance used in the compilation of fishery statistics are explained below.

Days absent.—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus, a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent 8 days.

Operating units.—Operating units as referred to in this document include persons engaged in the fisheries and fishing craft and gear employed.

Vessel.—The term "vessel" refers to a craft having a capacity of 5 net tons or more.

Boat.—The term "boat" refers to a craft having a capacity of less than 5 net tons.

Incidental catch.—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does not capture such species.

Percentages.—Percentages are usually shown as whole numbers. Fractions of percents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

Converting.—Many of the figures shown in the statistical tables published herewith have been reduced to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

Confidential data.—The statistical data collected by the Division are confidential and are not released except by approval of the Washington office. Statistics of production of wholesale and manufacturing firms are published only for commodities or geographical areas where the production of three or more concerns may be grouped. Every effort is made to publish only those figures which will not reveal individual enterprise.

CONVERSION FACTORS

It is the policy of the Bureau to show the detailed catch figures of all products in pounds for the sake of uniformity and for purposes of comparison. Following such a policy presents certain problems. In the case of fish there is little difficulty since in very rare instances are such products reported in units of measure other than pounds. For shellfish, however, the units of measure may be bushels, sacks, barrels, or thousands of shellfish, gallons of meats, etc. These many units make standardization difficult, but when coupled with the wide variation in the requirements or definition of some of these units in the various States the problem becomes even more complex.

All bivalve mollusks are reported in pounds of meats in the detailed catch tables presented in this report. In addition, there are included supplementary tables for most of the sections, which give data on the production in bushels. These supplementary tables also give the production of certain other shellfish, such as crabs, in number.

Oysters.—Probably the greatest problem in presentation of fishery statistics in uniform units of measure is in the case of oysters. Usually the production of oysters on the Atlantic and Gulf coasts is reported to Bureau agents in bushels; and prior to the data obtained for the year 1930 conversion from bushels to pounds of meats was effected on the basis of a uniform yield of 7 pounds of meats to the bushel. However, recent investigations have shown considerable variation from this figure. There follows a table which gives the results of these studies of the measures used for oysters in the various States and of the average yields per bushel. This table presents the factors that have been used in the oyster statistics given in this report.

Measures and yields of oysters [1]

State	Capacity of State bushel	Variation from United States standard bushel		Market oysters	
				Yield per State bushel	Yield per standard bushel
	Cubic inches	*Cubic inches*	*Percent*	*Pounds of meats*	*Pounds of meats*
Massachusetts	2, 150. 4			6. 57	6. 57
Rhode Island	2, 150. 4			6. 96	6. 96
Connecticut	2, 150. 4			6. 81	6. 81
New York	2, 150. 4			7. 00	7. 00
New Jersey	2, 257. 3	+106. 9	+5. 0	8. 70	8. 29
Delaware	2, 257. 3	+106. 9	+5. 0	7. 88	7. 50
Maryland	2, 801. 5	+650. 1	+30. 2	6. 57	5. 05
Virginia	3, 003. 4	+853. 0	+39. 7	6. 60	4. 72
North Carolina	2, 801. 9	+651. 5	+30. 3	5. 71	4. 38
South Carolina	4, 071. 5	+1, 921. 1	+89. 3	4. 76	2. 51
Georgia	2, 753. 4	+603. 0	+28. 0	5. 69	4. 45
Florida	3, 214. 1	+1, 063. 7	+49. 4	3. 29	2. 20
Alabama	2, 826. 2	+675. 8	+31. 4	2. 40	1. 83
Mississippi	2, 826. 2	+675. 8	+31. 4	2. 19	1. 67
Louisiana	2, 148. 4	−2. 0	−. 1	4. 14	4. 14
Texas	2, 700. 0	+549. 6	+25. 6	5. 05	4. 02

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[1] Data for the New England, Middle Atlantic, and Chesapeake States are for 1933. Other data are for 1932.

Other mollusks.—The following table shows the conversion factors for various mollusks, other than oysters, used in this report.

Average yields of certain mollusks in pounds of meats per bushel [1]

State	Clams, hard		Clams, soft		Clams, surf	Clams, razor	Mussels, sea	Periwinkles and cockles	Scallops, bay	Scallops, sea	Conchs
	Public	Private	Public	Private							
Maine	11	------	15	------	------	------	12	18	------	6	------
Massachusetts	11	11	15	------	17	32	10	18	6	6	------
Rhode Island	11	11	16	------	------	------	13	18	6	------	------
Connecticut	10	------	14	------	------	------	------	------	5.75	6	------
New York	8	8	16	------	12	------	10	------	5	6	18
New Jersey	8.96	8.96	20	------	12.5	------	13	11.85	6	6	18
Delaware	10	10	------	------	------	------	------	------	------	------	------
Maryland	8	------	------	------	------	------	------	------	------	------	------
Virginia	8	------	------	------	------	------	------	------	5.5	------	------
North Carolina	8	------	------	------	------	------	------	------	------	------	------
South Carolina	8	------	------	------	------	------	------	------	------	6	------
Georgia	8	------	------	------	------	------	------	------	------	------	------
Florida	8	------	------	------	------	------	------	------	5.3	------	------

[1] Data for the New England, Middle Atlantic, and Chesapeake States are for 1933. Other data are for 1932.

Other conversion factors.—The principal other conversion factors that have been used in this report are as follows:

Alewives	To convert number of fish to weight in pounds, multiply by 0.4.
Cod, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Cod, market, salted	To convert to fresh-gutted weight, multiply by 1.94.
Cod, scrod, salted	To convert to fresh-gutted weight, multiply by 1.98.
Crustaceans:	
Crabs, soft (New York, Maryland, and Virginia).	To convert number of crabs to weight in pounds, divide by 4.
Crabs, soft (North Carolina)	To convert number of crabs to weight in pounds, divide by 3.63.
Crabs, soft (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, hard (North Carolina)	To convert number of crabs to weight in pounds, divide by 4.
Crabs, hard (South Carolina and Georgia).	To convert number of crabs to weight in pounds, divide by 2.
Crabs, hard (Florida)	To convert number of crabs to weight in pounds, divide by 1.64.
Crabs, hard (Alabama and Texas).	To convert number of crabs to weight in pounds, divide by 1.72.
Crabs, hard (Mississippi)	To convert number of crabs to weight in pounds, divide by 1.92.
Crabs, hard (Louisiana)	To convert number of crabs to weight in pounds, divide by 1.86.
Crabs, hard (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, king	To convert number of crabs to weight in pounds, multiply by 4.
Crabs, rock	To convert number of crabs to weight in pounds, divide by 3.
Crabs, stone	To convert number of crabs to weight in pounds, multiply by 1.33.
Cusk, salted	To convert to fresh-gutted weight, multiply by 1.90.
Haddock, large, salted	To convert to fresh-gutted weight, multiply by 2.06.

Haddock, scrod, salted	To convert to fresh-gutted weight, multiply by 2.10.
Hake, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Hake, small, salted	To convert to fresh-gutted weight, multiply by 1.98.
Halibut, salted	To convert to fresh-gutted weight, multiply by 2.
Herring, salted	To convert to round weight, multiply by 1.50.
Mackerel, salted	To convert to round weight, multiply by 1.35.
Menhaden	To convert number of fish to weight in pounds, multiply by 0.6.
Oil (east coast)	To convert gallons to pounds, multiply by 7.74.
Oil (west coast)	To convert gallons to pounds, multiply by 7.5.
Pollock, salted	To convert to fresh-gutted weight, multiply by 1.90.
Sponges, dried (Florida):	
Large wool	To convert number of bunches to weight in pounds, multiply by 3.5.
Medium wool	To convert number of bunches to weight in pounds, multiply by 1.75.
Small wool	To convert number of bunches to weight in pounds, multiply by 1.
Wool rags	To convert number of bunches to weight in pounds, multiply by 2.25.
Grass	To convert number of bunches to weight in pounds, multiply by 1.
Wire	To convert number of bunches to weight in pounds, multiply by 1.5.
Yellow	To convert number of bunches to weight in pounds, multiply by 1.25.

COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding in the use of common names employed in the tables and discussions, the following list of common and scientific names is given:

Common and scientific names of the commercial fishery products caught in the United States and Alaska

Common name as shown in Bureau reports	Other common names	Scientific names
Albacore	Longfin tuna	*Germo alalunga* (Pacific coast).
Alewives	Branch herring, wall-eyed or big-eyed herring. Blueback, glut herring	*Pomolobus pseudoharengus.* *Pomolobus aestivalis.*
Amberjack		Seriola species.
Anchovies		*Engraulis mordax.* *Anchoviella delicatissima.* *Anchoviella compressa.*
Angelfish		*Pomacanthus arcuatus.* *Angelichtys isabelita.*
Barracuda		*Sphyraena argentea* (Pacific coast). *Sphyraena barracuda* (Atlantic coast).

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Black bass	Smallmouth bass	*Micropterus dolomieu.*
	Largemouth bass	*Micropterus salmoides.*
Bluefish	Tailor	*Pomatomus saltatrix.*
Blue pike	Pike perch, blue pickerel (Canada).	*Stizostedion glaucum.*
Blue runner or hard-tail.	Runner	*Caranx crysos.*
Bonito		*Sarda sarda.* *Sarda chiliensis.*
Bowfin		*Amia calva.*
Buffalofish		Ictiobus species.
Bullhead		Ameiurus species.
Butterfish	Dollarfish	*Poronotus triacanthus.*
Burbot	Lawyer, ling	*Lota maculosa.*
Cabio	Coalfish, crab eater, cobia.	*Rachycentron canadus.*
Cabrilla	Rock bass	*Epinephelus analogus* (Pacific coast).
Carp	German carp	*Cyprinus carpio.*
Catfish		Siluridae species.
Cero		*Scomberomorus regalis.*
Chubs	Tullibee in Canada; longjaw, bluefin, blackfin in United States.	All Leucichthys except *artedi* (in Great Lakes).
Cigarfish	Scad	Decapterus species.
Cisco	Herring in Canada	*Leucichthys artedi* (Lake Erie only).
Cod	Codfish	*Gadus macrocephalus* (Pacific coast). *Gadus callarias* (Atlantic coast).
Corbina	Orange mouth corbina	*Cynoscion xanthulum.*
Crappie	White crappie	*Pomoxis annularis.*
	Black crappie, strawberry bass, calico bass.	*Pomoxis sparoides.*
Crevalle		*Caranx hippos.*
Croaker	Crocus, hardhead	*Micropogon undulatus.*
Cunner	Chogset, blue perch, bergall.	*Tautogolabrus adspersus.*
Cusk		*Brosmius brosme.*
Dolly Varden trout	Salmon trout, bull trout	*Salvelinus parkei.*
Dolphin		*Coryphaena hippurus.*
Drum:		
Black		*Pogonias cromis.*
Red	Channel bass, redfish, spotted bass.	*Sciaenops ocellatus.*
Eels:		
Common		*Anguilla rostrata.*
Conger		*Leptocephalus conger.* Gymnothorax species.
Flounders	Dabs, blackbacks, lemon sole, winter flounder, summer flounder.	Pleuronectidae species.
	Halibut, "California"	*Paralichthys californicus.*
	Sole	*Psettichthys melanostictus* (Pacific coast).
Flyingfish		*Cysilurus californicus.*
Frigate mackerel	"Boo Hoo."	*Auxis thazard.*
Garfish		(See sea gar.)
Gizzard shad	Nanny shad, mud shad	*Dorosoma cepedianum.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Goldeye		Hiodon species.
Goldfish	Sand perch	*Carassius auratus.*
Goosefish		*Lophius piscatorius.*
Grayfish	Dogfish	*Squalus sucklii* (Pacific coast.)
	Spiny dog	*Squalus acanthias.*
	Smooth dog	*Mustelus mustelus.*
Groupers	"Sea bass"	Epinephelus species. Mycteroperca species.
Grunts	Margatefish, sailors choice (Key West).	Haemulon species.
Haddock		*Melanogrammus aeglefinus.*
Hagfish	Slimefish	*Myxine glutinosa.*
Hake	Squirrel hake, Boston hake, ling, black hake, mud hake.	Urophycis species (Atlantic coast).
	Merluccio	*Merluccius productus* (Pacific coast).
Halibut		*Hippoglossus hippoglossus.*
Hardhead		*Orthodon microlepidotus* (Pacific coast).
Harvestfish	Starfish, pappyfish; butterfish (N. C.).	*Peprilus alepidotus.*
Herring:		
Lake	Herring	*Leucichthys artedi* (Great Lakes, except Erie).
Sea		*Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast).
Herring smelt	Sea smelt	*Argentina silus.*
Hickory shad	Tailor shad	*Pomolobus mediocris.*
Hogfish	Capitaine, perro perro	*Lachnolaimus maximus* (Florida).
Horse mackerel		*Trachurus symmetricus* (Pacific coast).
Jewfish		*Promicrops itaiara.*
Kingfish		*Scomberomorus cavalla* (Atlantic coast).
	Little roncador, croaker	*Genyonemus lineatus* (California).
King whiting	Northern whiting, kingfish, seaming.	Menticirrhus species.
Ladyfish	Bonefish	*Albula vulpes.*
Lake trout		*Cristivomer namaycush.*
Launce	Sand eel, lant, sand launce.	*Ammodytes americanus.*
"Lingcod"	Cultus cod, blue cod, buffalo cod, ling.	*Ophiodon elongatus.*
Mackerel		*Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast).
Marlin	Spearfish	*Tetrapturus mitsukurii* (Pacific coast).
Menhaden	Mossbunker, pogy	*Brevoortia tyrannus.*
Minnows		Cyprinidae species.
Mojarro		Eucinostomus species.
Mooneye	Toothed herring	Hiodon species.
Moonfish		*Vomer setipinnis.* *Selene vomer.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Mullet	Jumping mullet	Mugil species.
Mummichog	Mayfish, killifish	Fundulus species.
Muttonfish		*Lutianus analis.*
Paddlefish	Spoonbill cat	*Polyodon spathula.*
Parrotfish		Scaridae species.
Perch (California)		(See surf fishes)
Permit	Great pompano	*Trachinotus goodei.*
Pigfish	Hogfish (N. C.)	*Orthopristis chrysopterus.*
Pike or pickerel	Great Lakes pike	*Esox reticulatus.* *Esox lucius.*
Pilchard	Sardine	*Sardinia caerulea.*
Pilotfish		*Naucrates ductor.* *Seriole zonata.*
Pinfish	Bream, salt-water bream	*Lagodon rhomboides.*
Pollock		*Pollachius virens.*
Pompano		Trachinotus species (Atlantic coast). *Palometa simillima* (Pacific tic coast).
Porgies	Porgee	Calamus species.
Porkfish	Sisi	*Anisotremus virginicus*
Quillback	Spearfish or skimfish	Carpiodes species.
Roach	Shiner	*Notemigonus crysoleucas.*
Rock bass	Redeye, goggle-eye Groupers	*Ambloplites rupestris* (Mississippi River to Atlantic seaboard). *Paralabrax nebulifer* (Pacific coast).
Rockfishes	Rock cod	Sebestodes species (Pacific coast).
Rosefish		*Sebastes marinus.*
Rudderfish	Blue bass, greenfish Halfmoon	*Girella nigricans* (Pacific coast). *Medialuna californiensis* (Pacific coast).
Sablefish	Black cod	*Anaplopoma fimbria*
Salmon:		
Atlantic		*Salmo salar* (Atlantic coast).
Pacific:		
Blueback, red or sockeye.		*Oncorhynchus nerka.*
Chinook or king.	Tyee, Columbia, Sacramento, spring.	*Oncorhynchus tschawytscha.*
Chum or keta.	Dog salmon	*Oncorhynchus keta.*
Humpback or pink.		*Oncorhynchus gorbuscha.*
Silver or coho		*Oncorhynchus kisutch.*
Steelhead	See steelhead trout.	
Sauger	Sand pike	*Stizostedion canadense.*
Sawfish		*Pristis pectinatus.*
Sculpin		Cottidae species.
Scup	Paugy or porgy, fair maid.	Stenotomus species.
Sea bass	Black jewfish or black sea bass. Black sea bass White sea bass	*Stereolepis gigas* (Pacific coast). *Centropristes striatus* (Atlantic coast). *Cynoscion nobilis* (Pacific coast).

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Sea gar	Needlefish, billfish, houndfish.	Tylosurus species.
Sea robin		Prionotus species.
Shad	American shad	*Alosa sapidissima.*
Sharks		Carcharodon species: Mustelus species; Carcharhinus species; Sphyrna species.
Sheepshead		*Archosargus probatocephalus* (Atlantic coast).
	Drum, fresh-water	*Aplodinotus grunniens* (Fresh-water).
	Redfish, flat head	*Pimelometopon pulcher* (Pacific coast).
Silver perch	Sand perch	*Bairdiella chrysura.*
Silversides	Spearing	Menidia species.
Skates		Raja species.
Skipper	Billfish	*Scomberesox saurus.*
Smelts		*Osmerus mordax* (Atlantic coast).
		Argentinidae species (Pacific coast).
	Eulachon	*Thaleichthys pacificus.*
Snapper:		
Mangrove	Gray snapper	*Lutianus griseus.*
Red		*Lutianus blackfordii.*
Snook	Robalo, sergeantfish	*Centropomus undecimalis.*
Spadefish	Porgy (N. C.)	*Chætodipterus faber.*
Spanish mackerel		*Scomberomorus maculatus.*
Splittail		*Pogonichthys macrolepidotus.*
Spot	Lafayette, goody	*Leiostomus xanthurus.*
Squawfish	Sacramento pike	*Ptychocheilus grandis.*
Squeteague:		
Gray	Gray trout, weakfish, trout.	*Cynoscion regalis.*
Spotted	Spotted weakfish, spotted trout.	*Cynoscion nebulosus.*
Squirrelfish		*Diplectrum formosum.*
Steelhead trout	Salmon trout	*Salmo gairdneri.*
Striped bass	Rockfish, rock	*Roccus lineatus.*
Sturgeon		Acipenser species.
Sturgeon, shovelnose		*Scaphirhynchus platorynchus.*
Sucker	Fresh-water mullet	Catostomidae species.
Sunfish		Lepomis species. Centrarchidae species.
Surf fishes		Embiotocidae species.
Swellfish	Puffer, swell toad, balloonfish, globefish.	*Spheroides maculatus.*
Swordfish		*Xiphias gladius.*
Tai		*Calumus brachysomus.*
Tautog	Blackfish, oysterfish	*Tautoga onitis.*
Tenpounder	Elops	*Elops saurus.*
Thimble-eyed mackerel.	Bullseye	*Scomber colias.*
Tilefish		*Lopholatilus chamæleonticeps.*
Tomcod		*Microgadus tomcod* (Atlantic coast). *Microgadus proximus* (Pacific coast).
Tripletail		*Lobotes surinamensis.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Tullibee		(See chubs.)
Tuna and tunalike fishes:		
Albacore	Longfin tuna	*Germo alalunga.*
Bluefin	Tuna, leaping tuna (Pacific coast). "Horse mackerel" (Atlantic coast).	*Thunnus thynnus.*
Bonito		*Sarda sarda* (Atlantic coast). *Sarda chiliensis* (Pacific coast).
Skipjack	Striped tuna	*Euthynnus pelayms.*
Yellowfin		*Neothunnus macropterus.*
Turbot	Greenland halibut American turbot	*Reinhardtius hippoglossoides* (Off New England) *Balistes carolinensis* (Off Florida)
White bass	White lake bass	*Roccus chrysops.*
Whitebait	Small fry of any fish.	
Whitefish:		
Common		*Coregonus clupeiformis* (Great Lakes). *Caulolatilus princeps* (Pacific coast).
Menominee		*Prosopium quadrilaterale*
White perch		*Morone americana* (Atlantic coast).
Whiting	Silver hake	*Merluccius bilinearis.*
Wolffish		*Anarhichas lupus.*
Yellow perch		*Perca flavescens.*
Yellow pike	Wall-eyed pike, pike perch, dore.	*Stizostedion vitreum.*
Yellowtail		*Ocyurus chrysurus* (Atlantic coast). *Seriola dorsalis* (Pacific coast).
Abalone		Halotis species.
Clams:		
Cockle		*Cardium corbis* (Pacific coast).
Hard	Butter	*Saxidomus nuttall.*
	Round clam, cherrystone, quahog, little neck	*Tivela stultorum* (Pacific coast). *Venus mercenaria* (Atlantic coast). *Venus mortoni* (Florida coast).
Pismo		*Tivela stultorum* (Pacific coast).
Razor		Enis species (Atlantic coast). *Siliqua patula* (Pacific coast).
Surf	Skimmer	*Mactra solidissimo.*
Cockles	Moonshell	*Natica heros* (Atlantic coast).
Conchs		Strombus species. Busycon species.
Coquina	Pompano shells	*Donax variabilis.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Crabs:		
Hard	Hard-shell crab, blue crab	*Callinectes sapidus.*
	Dungeness crab	*Cancer magister* (Pacific coast).
	Rock crab, hard crab	*Cancer irroratus* (Atlantic coast).
Soft	Soft-shelled crab, blue crab.	*Callinectes sapidus.*
King	Horseshoe crab	*Limulus* (Atlantic coast).
Stone		*Menippi mercenaria.*
Crawfish:		
Fresh-water	Crayfish	Cambarus species (Atlantic coast). Astacus species (Pacific coast).
Sea	Rock lobster, crayfish	*Panulirus argus* (Atlantic coast). *Panulirus interruptus* (Pacific coast).
Lobsters:		
Common		*Homarus americanus* (Atlantic coast).
Spiny	(See sea crawfish.)	
Mussels:		
Sea		*Mytilus californianus* (Pacific coast). *Mytilus edulis.*
Fresh-water		Quadrula species. Lampsilis species. Unio species. Symphynota species.
Octopus		*Octopus punctatus* (Pacific coast).
Oysters:		
Eastern		*Ostrea elongata.*
Western	Olympia	*Ostrea lurida* (Pacific coast).
Japanese (introduced).	Pacific	*Ostrea gigas.*
Periwinkles		Littorina species.
Scallops:		
Bay		*Pecten irradians* (Atlantic coast). *Pecten aequisulcatus* (Pacific coast).
Sea		*Pecten magellanicus.*
Shrimp		*Peneus setiferus.* *Peneus brasiliensis* (Atlantic and Gulf coasts). Pandalus species (Pacific coast). Pandalopsis species (Pacific coast). Crangon species (Pacific coast).
Squid		*Loligo opalescens* (Pacific coast). *Loligo pealei* (Atlantic coast).
Terrapin	Diamond-back terrapin	Malaclemmys species.

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Turtles:		
Green		*Chelonia mydas.*
Loggerhead		*Thalassochelys caretta.*
Hawksbill		*Chelonia inbricata.*
Snapping	Hardshell, alligator turtle	*Chelydra serpentina.* *Macrochalys lacertina.*
Soft-shell		Trionyx species.
Frogs		Rana species.
Irish moss		*Chondrus crispus.*
Kelp		Macrocystis species; Nereocystis species; Pelagophycus species; Alaria species.
Sponges:		
Glove		*Spongia graminea* (Hyatt) *Euspongia officianalis* (L.)
Grass		*Hippospongia equina cerebriformis.*
Sheepswool		*Hippospongia canaliculata gossypina.*
Yellow		*Hippospongia equina elastica.*
Trepang	Sea cucumber	*Cucumaris frondosa*; *Thyone briareus.*

PROGRESS IN BIOLOGICAL INQUIRIES, 1934[1]

By Elmer Higgins, *Chief, Division of Scientific Inquiry*

[With the collaboration of investigators]

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INTRODUCTION

The United States Bureau of Fisheries is the only Federal agency conducting research looking toward the development and conservation of the fishery resources in the United States. The major portion of research on conservation problems is conducted by the Division of Scientific Inquiry, for technological research is mainly promotive and contributes only indirectly to a solution of the problems of conservation by promoting a fuller use of fishery products. As a general rule, the State governments do not have facilities nor resources for the conduct of fishery research on an extensive scale. Many States, however, contribute to or cooperate effectively in work conducted by the United States Bureau of Fisheries.

The technical staff of the Division of Scientific Inquiry numbers 45 trained experts, with perhaps an equal number of temporary assistants at some time of the year, but the problems of the fisheries are as numerous as the species that are exploited. Some 30 important food and game fishes are the subjects of continuing research. To give adequate attention to the fisheries in all sections of the United States, both coastal and interior, and in Alaska, at least double this number of investigators would be required.

The aim of fishery investigations is to determine which species are showing depletion as a result of man's exploitation, what methods may be applied toward their conservation through the management of supplies on the basis of sustained yield, and the development of improved methods of cultivating aquatic animals. From a scientific standpoint research is conducted in the various fields of applied sciences, including fishery biology and aquiculture, and in the fundamental sciences of ecology, oceanography, limnology, physiology, systematic ichthyology, and biostatistics. Research projects during the past year were organized under three major branches: (1) Commercial fishery investigations in marine and fresh waters; (2) aquicultural investigations, including improvements in the propagation of fresh-water fish and the study of aquatic environments and pollution control; and (3) shellfishery investigations for the development of oyster farming and the control of shellfish pests. These projects are organized under seven distinct sections, each directed by a responsible and experienced fishery biologist, and are so distributed as to cover each of the major geographical sections of the United States.

The problems of the fresh-water fisheries throughout the country at the present time are concerned chiefly with increasing hatchery output and stocking interior waters. The chief hatchery problems concerning output are proper diet and the control of disease. Through 10 years of research the Division has found cures for several bacterial diseases of hatchery fish, and has improved diets until 1 pound of trout can be produced from 3 pounds of food, with an increase in efficiency in feeding of about one-third.

The most outstanding problems in the stocking of interior waters are concerned with the development of a stocking policy. More attention must be given to placing the fish in suitable waters which contain an adequate natural food supply, and to producing larger fish better able to survive than heretofore in order to provide better angling. In this field the Bureau is cooperating with the United States Forest Service in devising better management of fishery resources comparable with the improved game-management program.

One of the most serious limitations on the maintenance of abundant stocks of food and game fishes in interior waters and the chief hindrance in stocking these waters with additional supplies is pollution from domestic and industrial sources. The destruction of fish life by polluting substances, already acute in many localities, is growing rapidly throughout the more densely settled and industrialized sections of the country. A temporary staff, working on emergency funds, has made great progress during the past year in determining the effect of stream pollution on aquatic life. The classification of polluting substances according to their biological effects and the determination of their potencies will permit the formulation of standards of water purity favorable to the production of an abundant fish supply and form the basis of an effective policy of stream purification and protection.

The second major activity of the Division is concerned with investigations of the commercial fisheries. During the past 10 years progress has been made in determining the causes of great changes in abundance of commercial fishes. During the period continued observation of the trend and condition of the fisheries has revealed dangers of depletion and abuses in commercial practice that menace the supply. It remains, however, to educate the public regarding conservation measures to be followed voluntarily by the trade or to be enforced by legislation. It also remains to keep continual check by scientific means from year to year on the changing supply and the effects of regulation.

One of the most significant and promising new undertakings of the Division during the past year is the inauguration of a comprehensive study of the fisheries of the Columbia River Basin. Attacking the problem of the fisheries of the basin as a whole, attention is being given to such matters as regulation of the commercial fishing in the lower estuary of the Columbia, which is believed to be depleting the stock; the protection of upstream migrants from loss at power dams; the reclamation or improvement of spawning areas to increase natural reproduction; improvement in the technique of artificial propagation, where such is necessary to supplement natural propagation; the protection of downstream migrants from loss in irrigation works and at power dams; and the prevention of stream pollution. A competent staff has made a satisfactory beginning in this great undertaking, and if the management of the resource is based upon continued scientific studies we may be assured of its permanent productiveness.

The third branch of activity of the Division is concerned with the shellfish industry. Oysters are the most valuable single marine product and are the most susceptible to cultivation and management. The Bureau has assisted in continuing improvements in oyster farming, but there remains a vast field for service in directing oyster planting as a means of public relief and as conservation of the resources. Technical control and experiment are still required.

COOPERATIVE INVESTIGATIONS

For many years the Bureau has had valuable informal cooperation in fishery investigations from many institutions, both public and private, but the acceptance of formal cooperation was not legally authorized until the passage of an act of Congress approved May 21, 1930. The Bureau's program has always been closely correlated with work of various bureaus of the Department of Commerce from which it secures assistance of various kinds, chiefly relating to the promotive aspects of commercial fishery investigations. During the past year closer cooperation has been established with the United States Forest Service and the Bureau of Biological Survey of the Department of Agriculture, in relation to the development of fisheries of interior waters.

Reference has been made to fishery investigations conducted by the States. California has continued with the Bureau its cooperative investigations concerned with the trout supply, looking toward securing a more adequate supply of fish in streams and the more rational regulation of fishing within its borders. New York State has continued its cooperation in the conduct of studies of the nutritional requirements of trout to improve hatchery practices in feeding and rearing. Oregon has cooperated with a Bureau investigator in a study of fish diseases and hatchery practices. North Carolina, Connecticut, and Washington have assisted in investigations for the restoration of oyster beds in their coastal waters, and Georgia, Louisiana, and Texas have taken an active part in the study of the important shrimp fisheries investigations of the South Atlantic and Gulf coast. Despite the fact that State budgets have been reduced proportional to Federal budgets for these projects, this cooperation has been very effective and is greatly appreciated.

Another source of most valuable cooperation is provided by educational institutions, chiefly universities. Laboratory quarters for the Bureau's investigative staffs are provided by Harvard University as headquarters for North and Middle Atlantic fishery investigations, the University of Michigan as headquarters for the Great Lakes fishery investigations, the University of Utah for fishery investigations in the intermountain section, University of Missouri for investigation of interior waters, and Stanford University for California trout investigations. The Wisconsin Natural History and Geologic Survey has cooperated with the Bureau in many ways. Yale University, Cornell University, the University of Washington, and the Oregon State Agricultural College have likewise provided quarters or other facilities for investigative work.

The value of this type of cooperation cannot be overestimated. The Bureau's investigators receive, in addition to actual laboratory and office quarters, the use of university libraries, advice, and assistance from the university faculties, and many other courtesies which stimulate a community of interest in technical problems of the fisheries. The universities thus contribute to research of practical value and application to their own communities; and their graduate students receive stimulation and advice in research problems similar to those of the Bureau and frequently part-time or temporary employment in Bureau projects, all of which contributes to the progress of aquatic biology in the United States.

Grateful acknowledgment of these various forms of cooperation is made as a rule in the section dealing with fishery investigations in the various localities.

PUBLICATIONS

Owing to the curtailed funds for printing the number of publications resulting from investigations of the staff or conducted under the supervision of the Division has been reduced. The list of papers published by the Bureau during 1934 follows:

DAVIDSON, FREDERICK A.
  The homing instinct and age at maturity of pink salmon (*Oncorhynchus gorbuscha*). Bulletin No. 15, 13 pp., 10 figs.

DAVIS, H. S.
  Care and diseases of trout. Investigational Report No. 22, 69 pp., 15 figs.

HIGGINS, ELMER.
  Progress in biological inquiries, 1933. Appendix III, Report, Commissioner of Fisheries, 1934, pp. 313–383.

HILDEBRAND, SAMUEL F., and LOUELLA CABLE.
  Reproduction and development of whitings or kingfishes, drums, spot, croaker, and weakfishes or sea trouts, family Sciaenidae, of the Atlantic coast of the United States. Bulletin No. 16, 57 pp., 44 figs.

SETTE, O. E.
  Outlook for the mackerel fishery, 1934. Fishery Circular No. 17, 6 pp., 1 fig.

SETTE, O. E., and A. W. H. NEEDLER.
  Statistics of the mackerel fishery off the east coast of North America, 1804 to 1930. Investigational Report No. 19, 48 pp., 6 figs.

The following papers were published by members of the staff of the Division of Scientific Inquiry or cooperating investigators during the year 1934 outside of the Bureau of Fisheries' series:

DAVIS, H. S.
  The purpose and value of stream improvement. Transactions, American Fisheries Society, vol. 64, pp. 63–67.
  Growth and heredity in trout. Transactions, American Fisheries Society, vol. 64, pp. 197–201.

DEASON, HILARY J.
  Preliminary report on the growth rate, dominance, and maturity of the pike-perches (*Stizostedion*) of Lake Erie. Transactions, American Fisheries Society, vol. 63, pp. 348–360.
  The development of fishes. The Fisherman, vol. 3, no. 11, pp. 1, 3, November.

FIRTH, FRANK E.
Anthias nicholsi, a new fish taken off Virginia in the deep water trawl fishery. Copeia, no. 4, 1933 (1934).
Scyliorhinus retifer embryo in capsule. Copeia, no. 1, 1934.

FISH, FREDERIC F.
Ulcer disease of trout. Transactions, American Fisheries Society, vol. 64, pp. 252–258.

GALTSOFF, PAUL S.
The biochemistry of the invertebrates of the sea. Ecological Monographs, vol. 4, 1934, pp. 481–490.
Factors governing the propagation of oysters and other marine invertebrates. Proceedings of Fifth Science Congress, pp. 4119–4120.
The mystery of the ocean. Scientific Monthly, August 1934, pp. 172–175.
The use of slag in oyster culture. Fishing Magazine, March 1934, pp. 11–12.

HAZZARD, A. S.
Low water temperature, a limiting factor in the successful production of trout in natural waters. Transactions, American Fisheries, Society, vol. 63.
Limnological studies of the Strawberry Reservoir, Utah. [Abstract.] Proceedings Utah Academy of Sciences, Arts and Letters, vol. XI.
The Rocky Mountain whitefish. The Rocky Mountain Sportsman, January.
The rainbow and the steelhead. The Rocky Mountain Sportsman, March.
Improving our fishing waters. The Rocky Mountain Sportsman, April.
Progress of stream improvement in Utah. The Rocky Mountain Sportsman, November.

HAZZARD, A. S., and M. J. MADSEN.
Studies of the food of the cutthroat trout. Transactions, American Fisheries Society, vol. 63.

HIGGINS, ELMER.
A story of the shrimp industry. Scientific Monthly, vol. 38, pp. 429–443, May 1934.
Fishery biology, its scope, development, and applications. The Quarterly Review of Biology, vol. 9, no. 3, pp. 275–291, September 1934.

HILDEBRAND, SAMUEL F.
The capture of a young tarpon, *Tarpon atlanticus*, at Beaufort, North Carolina. Copeia, no. 1, 1934, p. 45.

HILE, RALPH
Causes of variation in the growth rates of fishes. The Fisherman, vol. 3, no. 2, pp. 3–4, 10–11, March–April.

HILE, RALPH, and HILARY J. DEASON.
Growth of the whitefish, *Coregonus clupeaformus* (Mitchill), in Trout Lake, Northeastern Highlands, Wisconsin. Transactions, American Fisheries Society, vol. 64.

HILE, RALPH, and WM. R. DUDEN.
Methods for the investigation of the statistics of the commercial fisheries of the Great Lakes. Transactions, American Fisheries Society, vol. 63, pp. 292–305.

HOPKINS, A. E.
Accessory hearts in the oyster. Science, vol. 80, pp. 411–412.
Accessory hearts in the oyster, *Ostrea gigas*. Biological Bulletin, vol. LXVII, pp. 346–355.

LOCKE, S. B., and A. S. HAZZARD.
The fish of Utah. Utah—resources and activities. State Department of Education.

LORD, RUSSELL F.
Hatchery trout as foragers and game fish. Transactions, American Fisheries Society, vol. 64, pp. 339–345.

NEEDHAM, P. R.
Quantitative studies of stream bottom foods. Transactions, American Fisheries Society, vol. 64, pp. 238–247.
Notes on the food of trout. California Fish and Game, vol. 20, no. 2, pp. 119–127.

NEEDHAM, P. R., and A. C. TAFT.
Observations on the spawning of steelhead trout. Transactions, American Fisheries Society, vol. 64, pp. 332–338.

Nesbit, R. A.
A convenient method for preparing celluloid impression of fish scales. Journal du Conseil, vol. 9, no. 3, pp. 373–376.
The fishery conservation problems of Long Island. Fishing Gazette, vol. 51, no. 8, pp. 27 and 29, and Fishing Gazette, vol. 51, no. 9, p. 41.
Pearson, John C.
Marking fish. Louisiana Conservation Review, vol. 4, no. 2, pp. 30–33, April.
Prytherch, Herbert F.
The role of copper in the setting, metamorphosis, and distribution of the American oyster, *Ostrea virginica*. Ecological Monographs, vol. 4, no. 1, pp. 47–107.
Scientific methods of oyster farming. Scientific Monthly, vol. 38, no. 2, pp. 118–128; Atlantic Fisherman, vol. 15, no. 4, pp. 17–18; Fish and Oyster Reporter, vol. 15, no. 8, pp. 2–3, 10–11.
Rehabilitation of public oyster beds in North Carolina. Atlantic Fisherman, vol. 15, no. 2, p. 14.
Oyster parasite threatens production in Florida. Fishing Gazette, vol. 51, no. 13, pp. 11 and 27.
Taft, A. C.
California steelhead experiments. Transactions, American Fisheries Society, vol. 64, pp. 248–251.
Van Oosten, John.
On the deep trapnet in the State of Michigan. [A letter, Dec. 13, 1934.] Michigan Tradesman, no. 2674, p. 25, December.
The value of questionnaires in commercial fisheries regulations and surveys. Transactions, American Fisheries Society, vol. 64.
Van Oosten, John, H. J. Deason, and Frank W. Jobes.
A microprojection machine designed for the study of fish scales. Journal du Conseil, vol. 9, no. 2, pp. 241–248.
Wright, Stillman, and Wilbur M. Tidd.
Summary of limnological investigations in western Lake Erie in 1929 and 1930. Transactions, American Fisheries Society, vol. 63, pp. 271–285.

The following progress reports covering the more important investigations of the Division during the calendar year 1934 were prepared in the main by the investigators in charge of the various projects.

NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

The experience of the last several years of economic depression has brought into focus an aspect of the economy of our marine fisheries hitherto overlooked, but of great significance to the fundamentals of conservation of our marine resources. It is generally agreed among fishery biologists that few, if any, of our marine species can be reduced to extinction by overfishing. Rather, the effect of progressive depletion is to lower the level of abundance, to reduce the return per unit of fishing effort, to raise the cost of production, and to increase prices. Theoretically, this process might continue indefinitely so that the products become luxuries utilized only by the more affluent consumer. But this means practical extinction of the fishery as a commercial enterprise. Obviously, the industry must depend on reasonable volume, which, in the fisheries, can be had only while its products remain low enough in price to remain in the staple class. The optimum condition, of course, is found where the level of abundance is such as to provide a maximum continuing volume of yield. However, the experience of New England's fisheries in the past several years has brought to light another limitation; that is, the level of abundance must be such that fish can be produced at a cost that can meet price competition with meats. This was not demonstrated by depletion of fish to the point of raising costs of production but by the lowering of meat prices to such a point that fish could not compete successfully at the ordinary level of abundance and ordinary cost of production.

It is imperative, therefore, that there be developed means of observing the changing levels of abundance and bringing forces to bear to counteract trends in the dangerous direction. This is being done in the case of several of the most important species of this region, including haddock, mackerel, squeteague, and scup, as will appear in the following pages. But the staff and its facilities have been inadequate to cover other almost equally important species, among them the lobster, shad, flounders, sea bass, bluefish, and cod, not to mention some twenty-odd other species of lesser importance but constituting in the aggregate an important segment of the coastal and offshore marine fisheries.

Even the species receiving consideration cannot be accorded the amount of study that the problems connected therewith require for solution. The most serious handicap under which the staff is operating is the lack of a sea-going research ship equipped for trawling. It is badly needed to survey the stocks of young haddock, upon which the future of the trawling fleet depends; to operate experimental gear so as to develop means of saving young fish from needless destruction now attending certain methods of fishing; to catch live fish for tagging in order that their migrations may be followed; and to take observations on conditions of the sea water of our fishing grounds that determine the success or failure of future broods. Additional personnel is needed to perform field work and to assist in the analysis of the field data. The fisheries of the region provide products valued at $25,000,000 annually as landed at the dock. The annual expenditure for the research on marine fishery problems of the region is only one one-hundredth of 1 percent of the value. This rate is too low to provide adequate insurance against unwitting overexploitation on the one hand or unsound restrictions on the other hand.

As in former years, the staff, under the direction of O. E. Sette, has been provided with laboratory and library facilities by the Harvard Biological Laboratories and the Museum of Comparative Zoology at Harvard University, Cambridge, Mass., where its members have also benefited from consultation with members of the university, especially Henry B. Bigelow, professor of oceanography and director of the Woods Hole Oceanographic Institution, whose wealth of knowledge and experience relating to marine fisheries research has been ever at the disposal of the Bureau employees. It is a pleasure also to acknowledge the continued cooperation of fishermen and fishing companies in providing data essential to the progress of the work.

HADDOCK

In 1934 the fishing activities of the New England haddock fleet were extended over a much wider area than in previous years, yet the total haddock catch was little greater than in 1933. The landings at the principal ports (these include all landings except a relatively small quantity at minor ports) reached about 135,000,000 pounds compared to 130,000,000 in 1933. However, for the first time in the history of the fishery the greater part of the catch came from the banks off the Nova Scotian coast (Sable Island, Banquereau), Browns, and La Have. The catch on Georges Bank (including South Channel and Nantucket Shoals), which in past years has averaged nearly 80 percent of the total United States landings, in 1934 declined to 40,000,000 pounds, the lowest in the history of the modern fishery, and but 30 percent of the total. The catch on the Nova Scotian banks by United States vessels reached 88,000,000 pounds.

The sharp decline in the Georges Bank fishery was the result of the continued poor fishing in this area, which caused practically all of the large trawlers and many of the large draggers to spend most of their time on the Nova Scotian banks. The great increase in running time to and from these more distant banks (Banquereau is about 625 miles from Boston, while Georges averages 180 miles) was more than compensated for by the greater catch per day's fishing.

The actual changes in the haddock population have been studied during 1934 along the lines described in previous annual reports. Investigation has continued under the direction of W. C. Herrington, assisted by J. R. Webster. Owing to a reduced staff and funds, field work has been confined almost entirely to the Boston Fish Pier where vessel interviews have provided information as to fishing time, fishing position, and other relevant data for practically all haddock trips landed. Extensive length-frequency data and scale samples were also obtained throughout the year from commercial catches made in each of the principal areas fished. F. E. Firth handled most of the work at the fish pier during the winter, and J. R. Webster or W. C. Neville during the summer, while Mr. Firth was assisting in the mackerel investigations.

Georges Bank and adjacent areas.—The haddock population in this area has been at a low level of abundance since 1929 and has shown little indication of recovery. In 1932 there was some improvement in the marketable stock caused by the growth to commercial size of the relatively numerous 1929 class. The gain was short-lived, however, for 1933 saw the level of abundance, as indicated by catch per day, again decline. This decline was caused by reduction in the stock through catch mortality (mortality due to the fishermen's catch) and natural mortality. The 1930 year class, which reached commercial size during 1933, was much too scanty to furnish sufficient contributions to the marketable stock to compensate for this mortality.

It has been mentioned that the 1934 haddock landings from Georges Bank amounted to only about one-half the quantity landed in 1933. However, this was due to the shift of a large part of the fishing effort to the Nova Scotian banks rather than to a decline in abundance on Georges. In fact, the catch per day for the first 8 months of 1934, as shown by our catch analysis, was some 15 to 20 percent higher than in 1933. (Figures for the balance of the year are not yet available.) There is some probability that this improvement in catch per day does not represent a proportional increase in the marketable population. The number of boats on which the 1934 catch analysis is based was reduced to about one-half of the large otter trawlers, a reduction made necessary by a much curtailed staff. This reduction was made reluctantly after a careful analysis had demonstrated that during 1932 and 1933 the fluctuations in the average catch per day of the smaller group were representative of the entire fleet. But during 1934 the principal activities of the large trawlers were transferred to the Nova Scotian banks and the boats in question remained on Georges Bank only when fishing was relatively good. If catches were poor, the boats moved to the more distant banks. Consequently, the higher 1934 catch per day may be due partly to this selective fishery and not represent an equally great increase in abundance. Limited facilities have not yet permitted us to examine this possibility through the analysis of records of the smaller boats which regularly fish on Georges Bank.

There seems little doubt but that the size of the marketable stock of haddock on Georges Bank was somewhat greater in 1934 than in 1933, even though the increase was not as great as indicated by the catch-per-day figures. This improvement was due partly to the fairly good 1931 class which reached commercial size during the winter of 1933–34 and spring of 1934, and partly to the great decrease in the strain imposed on the stock by the reduced commercial catch. With only about half as much haddock caught out during 1934 as in the several preceding years, the population level was maintained and even somewhat increased with only moderate additions of young fish.

The success of the fishery on Georges Bank during any year—that is, the return for a given unit of fishing effort—is primarily dependent on two factors: (1) The rate at which the commercial stock declines as the result of catch and natural mortality (this is largely determined by the intensity of the fishery); and (2) the contribution to the commercial stock from the young haddock spawned 3 years earlier. Thus, the 1929 class boosted the catch in 1932; and the 1931 class, in 1934.

To make accurate forecasts for the fishery 1 or 2 years in advance it is necessary that the above-mentioned factors be known. With present facilities for observation it is possible to determine the rate of decline of a stock of fish once it has reached commercial size, providing it is possible to estimate the amount of fishing effort that will be expended in that area. However, we now have no means of determining how much an incoming year class will affect the commercial catch, for we have no observations by which we can evaluate the abundance of such year classes until they achieve commercial size and have been represented in the commercial landings for a period of nearly a year. Inasmuch as there are great fluctuations in the abundance of the different year classes, the annual contribution from this source is highly variable and is the most important factor in determining the fluctuating level of the fishery. The relative level of abundance in two general areas such as Georges Bank and the Nova Scotian Banks largely determines where the fishing fleet will expend their major efforts; consequently, it determines the intensity of the fishery in either area. Therefore, it follows that the level of abundance of the marketable stock during the course of any year is affected both directly and indirectly by the contribution of young haddock to this stock. To estimate the size of this contribution a year or more in advance, it is necessary that it be possible to evaluate the abundance of haddock before they reach commercial size. For this work it is essential that a vessel be available for the collection of extensive samples of young haddock with small-meshed otter trawls.

An example of the limited reliability of forecasts based on present observations can be found in the 1933 annual report on haddock. That report discusses the probable course of the fishery on Georges Bank during 1934 and 1935. At that time it appeared that the catch per trawler day in 1934 would be somewhat less than in 1933. Actually the catch was somewhat better, due to the great reduction in fishing effort and to unexpectedly large contributions from the 1931 class, which it had been impossible to evaluate accurately until 1934, when it appeared in the commercial catch. Similarly, in the 1933 report the probability was expressed that the 1932 class was a failure and that consequently the fishery would continue to decline in 1935. Results of the fishery in the last part of 1934, however, indicate that the 1932 class is much larger than was supposed and may furnish a considerable contribution to the commercial stock. The abundance of this class cannot be determined from commercial-catch data until late in 1935. Consequently, at the present time it is impossible to make any predictions as to the 1935 fishery on Georges Bank except the general one that with fishing effort distributed as in 1934, the catch per day in 1935 probably will be considerably better than in the previous year.

Nova Scotian banks.—In 1934 nearly 90,000,000 pounds of haddock were landed from this area. This was about two-thirds of the entire United States catch and approximately twice as much as was ever before landed from these banks by the United States fleet. The actual level of abundance of commercial haddock, as shown by catch per day during the first 8 months of 1934, was about 10 percent higher than during the corresponding part of 1933. The increase was due to the 1929 class which came into the commercial fishery in the summer of 1933. (This same class on Georges Bank came into that fishery in the fall of 1931 owing to the faster growth rate in that area.)

The development of the fishery during the first 8 months of 1934 was much as anticipated in the 1933 annual report. At that time it was predicted that there would be an improvement in 1934 over 1933 in the catch per day during the spring and summer and a decline in the fall and winter. The spring and summer fishery has followed this trend although for various reasons the increase was not as great as was anticipated.

The fishery on the Nova Scotian banks should continue good in 1935 but somewhat below the 1934 level. However, this estimate can be no more than an approximation because of certain unevaluated factors. The 1931 year class will reach commercial size during the summer and fall of 1935 but it does not appear to be sufficiently abundant in this area to compensate fully for the decline in the present marketable stock owing to catch and natural mortality. Unfortunately, no reliable measure of the abundance of the 1931 year class is available due to the scarcity of information concerning the submarketable sizes. Our only basis for an estimate is a series of length-frequency samples of unculled haddock obtained through the assistance of Messrs. Einar Sorenson and R. H. Blake, radio operators on two of the large otter trawlers.

Early life history.—One plankton and hydrographic cruise was made in April–May 1934, covering the area from Cape Cod and Nantucket Shoals to Browns and La Have Banks off the Nova Scotian coast. As in 1933 the trip was made possible through the kindness of the Woods Hole Oceanographic Institution in detailing the research ship *Atlantis* for this work. At each of the 64 stations oblique tows were made with a 2-meter stramin net and a ½-meter silk net. Vertical tows were made at some of the stations with a 1½-meter Helgoland larvae net or 1-meter silk net. Temperature and salinity data were obtained at each station and 629 drift bottles and 6 large drift floats released at stations and in strings. The 2-meter and ½-meter nets, used with current meters and the electrical inclinometer developed for this work, provided some rather definite data on the effects of clogging and change in towing speed. A cursory examination of the collections indicates that medium-sized haddock larvae were taken in the region southwest of Georges Shoals in greater numbers than at any stations on previous cruises. Drift bottle returns at the end of December 1934, totaled 64. About one-half of these were from the Bay of Fundy and but one-fifth from the United States coast west of Georges Bank. Four reports were received of positions of the drift floats, one float being reported twice. The surface drift as shown by these data appears similar to 1932.

During the past year L. A. Walford of the Harvard Graduate School completed the analysis of the egg and larvae collections of 1931 and 1932. The results show spawning concentrations on eastern and northern Georges and sometimes in the South Channel and clearly demonstrate the effect of water movements on the distribution of eggs and larvae. Evidence also is found that the southerly drift off Georges Bank such as observed in 1932 may be a factor in the failure of certain year classes.

Savings gear.—During the 5 years since 1929 the haddock population on Georges Bank has been held at a low level of abundance in spite of the contributions to the commercial stock from two fair year classes. The continued low level of abundance is the result of the intensive and destructive fishery that has developed in recent years. Although only those haddock weighing 1½ pounds or more are marketable, most of the commercial trawlers use nets which capture fish of all sizes from about one-fourth to one-half pound up. Nearly 2 years are required for the young haddock to grow from one-fourth pound to the marketable size of 1½ pounds. During this period they are constantly subject to decimation by the commercial fleet, and the millions that are thus destroyed constitute a complete economic and biologic loss and reduce the stock of fish on the banks to the same degree as the capture of equal numbers of large, commercially valuable fish.

An investigational report covering the results of the Bureau's savings gear experiments was submitted for publication during 1934. This work shows that the most practical method for reducing the destruction of undersized haddock is to increase the size of mesh used in the otter trawls. A minimum cod-end mesh size of 4¾ inches (about 4⅛ inches after use) will capture only about one-fifth as many undersized haddock as the 3-inch mesh that generally has been used in the commercial trawls in the past. At the same time this mesh will lose less than one-tenth of the haddock between 1.5 and 2.0 pounds, and none above that size. The report recommends that the industry adopt a minimum mesh size of not less than 4¾ inches to be used in any part of the otter trawls except certain portions of the cod-end; e. g., belly and after end.

It is important that the recommendations of this report be followed by definite action. The trawler operators in general have recorded themselves in favor of the adoption of large-meshed nets, but for various reasons there has not been much consistent progress toward the use of such gear. A move for definite Federal or international regulation appears necessary for real progress. It is not a matter that can be postponed indefinitely, for already there has been a trend toward marketing the smaller sizes of haddock and once this practice becomes established it will be very difficult to obtain the adoption of large-meshed gear that will reduce the catch of such fish. The capture of small haddock, even though marketable, is a very short-sighted and irrational practice, for on Georges Bank 1 year's growth will cause a 1-pound haddock to nearly double and a half-pound haddock to nearly treble in weight; thus not only reaching a size that is of more value per pound but also increasing the actual poundage of fish in the ocean available to the fishermen.

In the light of present knowledge of the species the most practicable action that can be taken for the conservation of the haddock fishery is to leave the fish in the ocean during their early years of rapid growth and concentrate the fishery on the larger sizes where natural mortality approximately neutralizes the increase in the weight of the stock through growth. Such action would increase materially the catch that might be taken annually from the fishing banks. The use of mesh with a minimum size of 4¾ inches, as recommended, will protect most of the young haddock on Georges Bank until the end of their third year. This by no means is the ultimate to be desired, for a fourth year on the bank would cause a weight increase in these fish of about 70 percent, an amount that is much greater than the loss in poundage due to natural mortality. However, the recommended mesh size of 4¾ inches appears to be immediately practicable, and if acted upon would constitute a very considerable contribution to the future of the fishery.

The results of the United States and Canadian haddock investigations were presented at the 1934 meeting of the North American Council on Fishery Investigations. After a discussion of these results the council approved the report of the Committee on Haddock Investigations. Following are some of the more important recommendations:

> The committee endorses the opinion expressed at the general meeting of the council that the haddock problem has become of major importance to Canada and the United States (on the Atlantic coast); that immediate steps should be taken to adopt a common plan of investigation, which would adequately keep the situation under review and lead to the adoption of remedial measures.
>
> Further, the committee urges the adoption of a joint program of intensified research into the biology of the haddock, * * *.

> The committee finds that existing facilities are quite inadequate to enable this broad program to be entered into. The prime essential is a suitably equipped research vessel, * * *.
>
> Additional personnel will be essential in both countries, as far as the United States part of the program is concerned at least two fish measurers or quay men would be required to collect statistics of commercial catches, and a technical assistant would be necessary to assist in laboratory work and sorting of material.
>
> It is recognized that, even by making such provision, the authorities will not provide for a full completion of the program outlined. Some aspects, especially those of the early haddock stages, will receive quite inadequate attention in the absence of the provision of a suitable research vessel.

It has not yet been possible to make a start on any of the projects of the joint program because of the unavailability of additional personnel or facilities.

MACKEREL

The paramount influence on the stock of mackerel in the sea (and consequently the size of the catch) is the variability in the degree to which annual recruits of young mackerel serve to offset the decline due to mortality of the older stocks. Since 1925 continuous observation of the catch and its age composition has proved that certain year classes, such as those of 1923, 1928, 1930, and 1931, were so plentiful as to more than offset mortality of the older stocks. Certain others, those of 1924, 1927, and 1929, were so poor that they did not fully counterbalance mortality of the adult stock; and still others, those of 1925 and 1926, were practically nonexistent.

These variations in numerical strength of the different year classes have been the dominating cause of all the fluctuations that have occurred in the last 9 years and have formed the basis of annual predictions on yield since 1928.

Although the ultimate causes of fluctuations—the conditions responsible for inequality of the year classes—remain unknown, it is fairly certain that they cannot be controlled by man, for they come into play while the mackerel are very young and before commercial fishing has any effect on them. There remains, however, the problem of making the best possible use of such year classes as the conditions in the sea permit to survive. This is being done in part by the predictions already mentioned for they permit the members of the industry to foresee, in general, the prospects for the coming season. Thus, the disorganizing effects of fluctuating supply can be minimized to the extent that the affairs of their business can be altered to meet the situation.

These predictions take into account only the general level of abundance for the season as a whole. In many ways it would be more useful to have foresight of what is to happen during the parts of the season. For instance, if scarcity were destined to prevail during the latter part of the season, freezing and salting could be accelerated during the early parts and vice versa. This would benefit the fisherman by expanding the market during times of glut and benefit the buyer by avoiding to a greater degree the understocking or overstocking of frozen and salted mackerel.

The third and perhaps most important question to be solved before the most effective use can be made of this resource is the relative value, biologically speaking, of the yearling mackerel. Following the advent of successful year classes, these are caught in large quantities. They are fairly small (½ to 1 pound each), have poorer keeping properties than the larger mackerel, and command a lower price per pound. At the same time they are growing fast and are destined to double in weight during the next year. It is appropriate, therefore, to inquire whether a partial or total elimination of the yearling mackerel from the catch might not be more than repaid by the larger size and the greater value per pound of these fish in future years. Essentially it is a question of whether apparent mortality (rate of disappearance as measured by the catch per unit time of fishing) is greater than the increase in value due both to increase in poundage and price per pound.

The answer to this question is complicated by the fact that the rate of disappearance of yearling mackerel differs greatly from one year to another and that the differences are connected not with the numbers caught out during the yearling year but with the type of year class to which they belong. There appear to be at least two types of mackerel in the western Atlantic; one, which we have designated as "persistent"; the other as "transitory." The former is characterized by a low rate of annual disappearance, the latter by a high rate. They are distinguished by other peculiarities such as the time and locality of greatest concentration and differences in rate of growth.

The existence of the two types with their different rates of disappearance not only renders difficult a decision as to the merits of exploiting yearling mackerel but also causes predictions to be less assured and less definite. It is essential, therefore, to determine the basis for the differences in behavior of these two subdivisions of the population and especially to find means of distinguishing between them at an early stage, in order to foresee their subsequent decline.

Naturally, the work during 1934 consisted of collecting and analyzing data necessary for determining the rate of catching and the year class composition of the commercial run. This has been and must continue to be the only means of appraising the current condition of the fishery. In addition, a new technique was employed to analyze the size frequency distribution of the 9-year period to throw more light on the nature of the two types of year classes, and the catch statistics were reanalyzed to discover whether the periods of presence of the two types were sufficiently distinctive and regular to serve as a basis of within-the-season predictions.

The work continued, as in the past, under the direction of O. E. Sette. Field data were collected by F. E. Firth. They consisted of 1,413 interviews to obtain information on time and locality of catches, measurement of 39,605 mackerel, and collection of 1,467 scale samples.

The prediction for 1934 was that the abundance would be the same as in the previous year and that the catch by seiners would amount to approximately 54,000,000 pounds if fishing were unrestricted, and proportionately less if control of production were to take place under provisions of the mackerel code. If these were to be of equal extent to those employed by voluntary agreement, a catch of 28,000,000 pounds was to be expected. Actually, production control was exercised during a smaller portion of the season and the catch was accordingly larger, being about 35,000,000 pounds. The level of abundance has not yet been estimated, there being extended computations required to adjust for the effects of production control on the measure of abundance. However, it appears that the abundance was practically equal to or slightly above the predicted level.

During 1934 O. E. Sette served as administration member of the executive committee of the Atlantic Mackerel Fishing Industry Code. The provisions of the code were effective in preventing the dumping and wastage of mackerel such as had occurred during the previous season but were less successful in substantially increasing the income of mackerel fishermen.

Lack of sufficient personnel has prevented progress during the year on the vital matter of finding out the nature of the two types of mackerel and the means of distinguishing them at a sufficiently early stage to be of use in forecasts, as well as to thrown light on the merits of exploiting yearling mackerel. This work would require large-scale tagging experiments at sea accompanied by examination of large numbers of mackerel from various areas and various portions of the season to discover whether there are reliable racial characters that distinguish the two types. Although it was impossible to include these particular items in the program, a small beginning was made on examination of mackerel for racial characters, but the numbers of individuals and the distribution of samples were far too limited to provide any conclusions.

If proper utilization of this important resource is to be attempted, it will be necessary to provide additional personnel both for field observations and laboratory analysis.

COD

Although the total catch of cod has not suffered a decline of the sort to cause concern over the future of this very important resource, there is good reason to suppose that the time may come in the not-too-distant future when heavier fishing intensity may have its effect. Even now the catch in southern New England, New York, and New Jersey waters is undergoing a severe decline, and we are ignorant of its cause or the remedies. Previous work has shown that this population is practically independent of the larger bodies of cod to be found from Georges Bank eastward to the Grand Banks, and it is possible that this southern segment of the species is undergoing a decline that should receive remedial attention.

For some years in the past the Bureau conducted large-scale tagging experiments on the cod which provided enlightenment on the relationships of the stock occupying the several grounds, showing that the southern segment was independent of all others, that the Maine coast was also primarily self-contained though acting as a feeder to the coastal waters of Nova Scotia and possibly to offshore grounds such as Georges Bank.

With the resignation of William C. Schroeder from the Bureau's service, this work ceased except for the analysis of returns currently received from tagging done during 1931 and 1932 which Mr. Schroeder has kindly continued to study and upon which he reports as follows:

> Of 1,199 cod marked during 1931 with celluloid disks attached to the caudal peduncle and released off Mount Desert, Maine, 23.4 percent were recaptured

up to the end of 1932, 1.1 percent in 1933, and 0.3 percent in 1934. Of the total recaptures (24.8 percent), 90 percent were taken locally and 10 percent from distant localities. Of 1,481 cod marked during 1932 with celluloid strips inserted into the body cavity and released in the above-mentioned locality, 18.6 percent were returned up to the end of 1933 and 2.8 percent in 1934. Of the total returns of 21.4 percent, 91 percent were recaptured locally and 9 percent at distant points.

These experiments were undertaken in order to determine whether the young cod that predominate in the population along the shore migrate away from the shore as they grow older, thus serving to replenish the important fishing banks offshore. While these experiments have produced a higher proportion of distant recaptures than resulted from earlier experiments with less permanent tags, there does not appear to be any decided trend toward offshore recaptures as the fish grow older. To be sure, the fish involved in the experiment have not yet reached the age that is most common on the offshore grounds, and the experiment needs to run until they do reach such age before negative results become significant. However, the sharp reduction in returns threatens to reduce the numbers to the point of unreliability before this stage in the experiment is reached. It is believed that the sharp decline in returns from the 1931 releases is due to loss of the celluloid disks, and from the 1932 releases, to the belly tags becoming covered with mesenteric tissue so that they escape detection, especially on the offshore grounds where the fish are cleaned very hurriedly. Thus, it may be necessary to have further improvement in marking methods or to approach this question by another method, perhaps scale studies, in order to solve the problem.

At present the trawling fleet fishes mainly for haddock. Studies of the haddock resource (see above) make it appear certain that increased fishing will cause no considerable or sustained increase in the yield. This being the case, we can anticipate a more intense fishery for cod. In fact, there appears to be a trend in this direction already, and it is urgent, therefore, that studies of the condition of the cod resource be resumed. The most effective corrective measures are those that are applied before irreparable damage is done. Since the major portion of the fishery is carried on by a fleet of vessels which land their catches mainly at Boston, only a moderate outlay would be necessary to make the pertinent observations on the condition of this fishery along with those now made on haddock.

FLOUNDERS

The flounder fishery has assumed major importance during the last two decades. The various species of flounders are caught mainly by the smaller vessels of the otter trawl fleet commonly called "draggers." This type of boat has been increasing in numbers and concern is felt as to the capability of the resource to withstand the present intensity of fishing—so much so that several of the flounder-producing States have passed laws restricting the flounder fishery in various ways. Further restrictions are contemplated in at least one of these States. Although such restrictions are based on good intentions, they have not been preceded by any examination into the question of whether they will produce the desired results. No one knows whether the present sacrifices they impose will be compensated by future gains. In fact, little is known of the life history of the six species that make up the catch. Nothing is known of their rate of growth, the amount of migration from one region to another, or most important, to what degree the annual replacement compensates for removals by the commercial fishery and by natural mortality.

A single small experiment was undertaken in 1931 when some 4,000 winter flounders from Waquoit Bay were tagged and released. The returns in successive years from 1931 to 1934, inclusive, were 141, 64, 33, and 11. Unfortunately, we do not know what proportion of the decline in returns was due to loss of tags and what portions to mortality, but the results do not preclude the possibility that the rate of mortality of flounders is relatively high. The returns indicate that most of the Waquoit Bay stock returns there for spawning each winter, but during the summer they wander into the adjacent sounds and into the open sea beyond. During last season there was one return from Massachusetts Bay—the first indication that the flounders from south of Cape Cod may wander to its northern side. Previous distant returns were from Georges Bank to the east and from western Long Island to the west.

To formulate an effective conservation policy, it will be necessary to institute a series of observations similar to that employed in the case of the haddock and mackerel, whereby statistics are collected in such detail that an index of abundance could be computed in terms of catch per day's trawling. Field data for determining rate of growth and for arriving at the age composition of the catch from each important fishery area would need to be collected and studied, and additional tagging would have to be done to determine to what extent one locality is dependent on another for its stock. The distribution of the flounders is extensive so that observers would be needed at at least four ports. Thus, a staff of four members or more would be required for the field work alone and additional persons would be needed in the laboratory.

The need for undertaking this work is imperative. The total yield of flounders has already begun to decline (20 percent between 1929 and 1932) and several seasons must elapse before results from an investigation can be expected. If this fishery is allowed to retrograde too seriously before corrective measures are applied, either these will be more drastic than if applied earlier or the fishery will be stabilized at a lower level of yield than would otherwise need be the case.

SPECIES IN NEED OF ATTENTION

Lobster.—The lobster fishery has declined steadily in productiveness since the time that earliest statistical evidence is available. The present annual catch is but one-third as large as in 1889, and, in spite of the ever-increasing number of lobster pots in operation, the present rate of decline is 10 percent per annum. Consequently, the annual decrease in abundance must be substantially more than 10 percent.

The decline has persisted for years in spite of State laws intended to preserve the resource. These laws consist mainly of a limit on the size of lobster which may be sold legally. It is imperative to determine, by a survey of the lobster population, whether such size limits protect a sufficient percentage of the stock. Furthermore, since the regulations on sale of undersized lobsters have been found extremely difficult to enforce, it is further necessary to find some more effective means of securing the necessary protection. It is desirable, therefore, to test lobster pots designed to catch only certain sizes and introduce such modifications as are indicated by the tests. If such pots prove satisfactory, both from the standpoint of catching efficiency and from the standpoint of excluding the protected sizes from the catch, a definite improvement in regulation could be attained.

After an initial survey has determined the percentage of the population to be protected by size limits or other means, a continuous observation of the effects of new regulations would be necessary to determine their adequacy.

SHORE FISHES OF THE MIDDLE ATLANTIC STATES

The shore fishes of the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) are of especial interest because they not only support an important commercial fishery but also provide a basis for a sport fishery the magnitude of which is not generally appreciated. Quite aside from its recreational value, this sport fishery has commercial aspects of great importance. The business of catering to the needs of anglers (boats and guide service, transportation, tackle, and bait) has reached astonishing proportions and has become an important item in the economics of seashore communities in these States.

Investigations of these shore fishes were continued under the direction of R. A. Nesbit, assisted by W. C. Neville. As in 1933, reduction of appropriations necessitated severe curtailment of activity. Field work was limited to a single visit to producing areas in October and to a 3-month observation of the catches made by the winter-trawl fishery. Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation, continued his studies of the early life histories of these fishes in southern New Jersey.

Squeteague.—By the end of 1933 satisfactory methods of investigation had been developed and enough of the data collected between 1927 and 1933 had been analyzed to permit a summary of the principal scientific findings with regard to the life history of the squeteague. In 1934, additional scale and length frequency data, secured in October, were analyzed, and additional tag returns were received. Also, a large part of the earlier scale collections were examined according to the circulus spacing method for determining origins and subsequent migrations. The results confirm and strengthen the views expressed in the 1933 report.

Since the conservation recommendations which follow are based on these scientific findings, it is desirable to summarize them briefly:

(1) Not more than one-half of the squeteague taken north of Delaware Bay are the product of local spawning. This view is based on the observation that not more than one-half of the northern squeteague have scales of the type characteristic of northern juveniles. It is possible that even these northern juveniles are the product of southern spawning, migrating to northern waters early in the first summer of their lives. This suggestion is based on the observations of Professor Parr. Although he has found squeteague eggs in several New Jersey and New York localities each year from 1929 to 1934, the larvae are uniformly absent from the collections. This is in marked contrast to the presence of larvae in Virginia and North Carolina waters as reported by Hildebrand and Cable (1934) and by Pearson (unpublished manuscript).

(2) Nearly all (90 percent or more) of the squeteague taken in the Middle Atlantic States are 2 years of age or older, and nearly all have passed their yearling summer south of Delaware Bay. This view is based on age analysis of large samples collected at various localities in New York and New Jersey between 1928 and 1934 and on the observation that the second (yearling) growth zones of the scales of virtually all northern market squeteague are of the type characteristic of the corresponding growth zones of southern yearlings. The conclusions drawn from scale studies are confirmed by tagging experiments.

(3) Yearling squeteague predominate in the southern catches. This observation is based on age analysis of samples taken by Higgins and Pearson in 1925 in North Carolina and of samples taken during the present investigation in Virginia and North Carolina in 1928, 1929, 1931, 1933, and 1934.

(4) Squeteague grow much more rapidly in the North than in the South. For example, squeteague at the end of their third summer average only 11 inches in length and 0.43 pound in weight south of Delaware Bay. In southern New Jersey they average 12 inches in length and 0.56 pound in weight and in northern New Jersey 13 inches in length and 0.75 pound in weight.

For a number of years restriction of both the commercial and angling catch of squeteague has been urged in New York and New Jersey. In New York such proposals have invariably been rejected by the legislature. In New Jersey a number have been adopted, among them prohibition of purse seining within 2 miles of the shore, restriction of the length of gill nets, specification of minimum mesh size for gill nets, and imposition of closed seasons for gill-net fishing in certain areas. Restrictions are usually urged on the ground that abundance may be maintained or increased in the future by protecting spawning adults.

In the light of our present knowledge of squeteague life history, it is apparent that restriction of the New York and New Jersey catch of adult squeteague cannot be expected to influence future abundance sufficiently to compensate for the immediate sacrifices required. As has been pointed out, the northern spawning stock is not wholly self-perpetuating but depends on southern spawning for at least half of its annual increment even if it be assumed that northern juveniles result from northern spawning. This means that of the fry resulting from the spawning of 2 northern adults, on the average but 1 weak fish returns to the North 2 years later. Consequently, in order to add 1 more weak fish to the catch in 1937, it would be necessary to refrain from catching 2 in 1935, obviously an unprofitable bargain, even if the cost of enforcing restrictive legislation be left out of account.

It is necessary to consider other measures if the present unsatisfactory conditions in the Middle Atlantic States are to be improved. The yield of squeteague in these States has declined from an average of 17,000,000 pounds per annum for the years 1901, 1904, and 1908 (years for which statistics are available), to an average of 12,000,000 pounds for the years 1926, 1929, 1930, 1931, and 1932. It is highly probable that this decline is in large part due to an increase in the catch of the southern fishery (Maryland, Virginia, and North Carolina) from an average of 11,500,000 pounds per annum in 1901 and 1908 to an average of 18,000,000 pounds per annum for the years 1925, 1929, 1930, 1931, and 1932. It has been seen that virtually the only squeteague available to the northern fishery are those which escape the intensive southern fishery to which they are subject during their yearling summer. If the increase in yield in the South were due to increased abundance rather than to an increase in the percentage toll taken by more intensive fishing, it is to be expected that a similar increase would have occurred in the northern fishery.

It does not necessarily follow, however, that the most effective use of the squeteague resource requires restriction of the southern fishery. It is unwise to postpone capture of fishes beyond the point where natural mortality removes more pounds of fish than are replaced by growth. Since the investigation has not progressed sufficiently to make possible reliable estimates of natural mortality, it cannot be said fairly that the yearling squeteague taken in the south would be more valuable if spared for an additional year or more.

Although there is insufficient evidence to justify restriction of that portion of the southern catch which is actually utilized, the present destruction of juvenile and yearling squeteague too small to be marketed cannot be too strongly condemned. As pointed out by Higgins and Pearson (1925), this destruction may amount to as much as 30 percent of all squeteague taken. There can be no reasonable objection on the part of southern fishermen to elimination of this waste, for enough of the benefit would accrue locally to compensate for any inconvenience brought about by changed methods of fishing. It is urgent, therefore, that experiments be undertaken at once to devise modifications of the gear to permit the escape of undersized fish.

Scup.—Continued investigation of this species by W. C. Neville during 1934 has been concerned with determining the effect, if any, on abundance of the increased exploitation to which this species has been subjected since about 1929. As stated in previous reports, the rapid development since that year of a winter trawl fishery off the Virginia capes for scup, sea bass, and fluke has resulted in an additional strain of approximately 25 percent on the general stock of scup. The analysis, therefore, has been mainly a study of the fluctuations in the catch of both the summer and winter fisheries to determine whether the changes are related to the increased fishing activity.

It has been demonstrated clearly from tagging experiments and from the ages and sizes of the fish in the catch that the summer and winter fisheries are drawing on the same stock of scup. Tagging experiments have demonstrated that scup migrate in the fall from the summer fishing grounds along the shores of southern New England, New York, and New Jersey to the winter fishing grounds off the Virginia capes, and in the spring make a return migration from the winter grounds to the summer area. Analysis of the catches has disclosed that broods of scup that have been conspicuous in the summer fishery have constituted a large part of the catch of the southern trawl fishery in the following winters.

Observation on the summer fishery during 1934 was not possible, through lack of funds, so that nothing definite is known as to what age groups are supporting that fishery at the present time and as to the degree of success of reproduction in 1933 and 1934. Analysis of catch-record data supplied voluntarily by pound-net operators, however, indicates a high yield of scup in 1934 continuing the series of record total catches this particular fishery has experienced each summer since 1929 (for the State of New Jersey the pound-net catch rising from 2,400,000 pounds in 1929 to 3,500,000 pounds in 1933), following a period of scarcity from 1926 to 1928, inclusive (500,000 pounds in 1926 to 300,000 pounds in 1928). The record yields of 1929–33 were the result of successful spawning each season from 1927 to 1932, with the exception of 1929.

Observations on the southern trawl fishery during the past winter (1933–34) showed that the catch of approximately 2,500,000 pounds of scup landed principally at Virginia ports was the highest in the history of the fishery. As in most previous winters, the size and age composition of the landed catches was similar to that usually observed in the summer pound-net fishery, consisting, in the main, of small and medium-sized fish (7 to 9 inches in length, averaging one-fourth to one-half pound in weight).

It was disclosed further, in accordance with previous winters' observations, that the catch of this southern winter trawl fishery is not only dependent on abundance but also on the degree of availability, which in turn is affected by changes in the hydrographic conditions of the general fishing region. It is now known that changes in water temperatures affect the movement of the schools, causing changes in the amount and in the size of fish caught.

Thus, as indicated above, the total yield of scup by the summer and winter fisheries continues at record levels due to a series of successful spawnings. This condition cannot be expected to continue indefinitely. Sooner or later a series of spawning failures similar to those which caused the natural decline between 1926–28 will occur.

It is but prudent, therefore, to prepare for this condition by correcting existing abuses which may accelerate the inevitable decline or endanger the chances of natural recovery. The most conspicuous abuse is unnecessary destruction of young fish both in the winter trawl fishery and in the summer pound-net fishery. During the past winter the southern trawl fishery discarded at sea large quantities of small scup consisting in part of fish below legal limit and in part of small but legally marketable fish for which, under the economic conditions of last winter, no market could be found.

It is estimated that for a total catch of approximately 2,400,000 pounds of scup landed by vessels at Virginia ports in January, February, and March, more than 500,000 pounds or 20 percent were discarded at sea. Expressed in numbers of fish it means that of a total catch of approximately 4,700,000 scup, about 1,900,000 fish or 40 percent were destroyed and discarded. It is probable that an even larger proportion of the catch of vessels landing at ports in New York and New Jersey was discarded since the smaller sizes of fish are less readily marketable there.

Less definite figures are available for the pound-net fishery, particularly in recent years, but the waste is known to be great in the summers following the advent of large broods.

The advantages to be derived from reduction of this waste are as follows: (1) Since the fish now destroyed have no value, a clear gain will be realized from those allowed to escape and grow to marketable size, even though reproduction continues to be successful for several years; and (2) when reproduction fails during a series of years (as experience indicates is inevitable), young fish thus spared will be doubly valuable, for they will increase the spawning reserve necessary to insure eventual natural recovery and they will augment the stock available to the fishery during the period of scarcity.

It is desirable, therefore, that experiments be conducted to determine the practicability of extending to the Middle Atlantic pound-net fishery the practice of sifting out small scup now generally used by operators of floating traps in Rhode Island. It is also desirable to reduce the waste of young fish in the winter trawl fishery by introducing changes in the mesh of the cod-ends of the trawls. Considerable experiment will be necessary to determine the correct sizes, for the problem is complicated by the fact that more than one species must be considered (in addition to scup, sea bass and fluke demand attention). Lack of funds has prevented experiments thus far, but it is urgent that they be undertaken at the earliest possible date.

Other species.—A number of important species have perforce been neglected during the course of Middle Atlantic investigations. Among them are sea bass, bluefish, and shad. Since bluefish and sea bass are taken to some extent by the summer pound-net fishery and sea bass constitutes an important part of the catches of the winter trawl fishery, advantage was taken of the opportunities to collect many data bearing on them at times when field observations were being made of the catches of squeteague, scup, and butterfish by these fisheries. Because of insufficient personnel it has been impossible to analyze the data collected and impossible to arrange for observations of the hand-line fisheries for bluefish and sea bass, and the lobster-pot fishery for sea bass. It is particularly urgent that investigations of sea bass be undertaken, for this species has been subjected to a greatly increased fishery strain through the rise of the lobster-pot fishery and the winter trawl fishery in recent years.

The shad fishery in the Delaware River has practically disappeared. In 1897 the yield of this fishery was 16,098,552 pounds, valued at $436,546. In 1932 the yield had shrunk to 109,979 pounds, valued at $15,469. Even if we assume that the yield in 1897 was excessive and that under proper management the fishery is incapable of a constant yield of more than half of the quantities caught in 1897, it is apparent that the destruction of this fishery is causing an annual loss of more than $200,000 to the communities concerned and is depriving the consuming public of approximately 8,000,000 pounds of very desirable food. It is probable that pollution and obstruction of streams is in large part responsible, for in spite of very intensive fishing the yield in the less highly industrialized Chesapeake States has not diminished so severely. It is urgent, therefore, that rehabilitation be undertaken in accordance with the authorization provided by Public Law No. 121, Seventy-third Congress, March 10, 1934.

It is also desirable to seek means of restoration of the shad fishery in other localities where the destruction is not yet complete. The present yield in the Chesapeake States and in the Hudson River is greatly reduced as compared with earlier years. Biological studies of shad life history, statistical study of fishing intensity, and pollution studies will be necessary to indicate the best procedure for rehabilitation and management of these fisheries.

FISHERY INVESTIGATIONS OF THE SOUTH ATLANTIC AND GULF COASTS

INVESTIGATION OF THE SPAWNING HABITS, LARVAL DEVELOPMENT, AND RATE OF GROWTH OF FISHES

The study of collections of young fish and field data collected principally on the coast of North Carolina was continued intermittently, as other duties permitted, by Dr. Samuel F. Hildebrand and Louella E. Cable. Additional specimens were obtained from Beaufort, N. C., and vicinity from towings made by Dr. James S. Gutsell in his study of the life history of shrimps. Several nearly complete and some partial series showing stages in the development were identified. Drawings, and in some instances descriptions, have been prepared.

SURVEY OF THE FRESH WATERS OF MISSISSIPPI

A general survey of the fresh waters of Mississippi was begun by Dr. Hildebrand in 1933. Although it was not found practicable to continue the field studies in 1934, considerable time was devoted to a study of the collections obtained the previous year. A special study of the minnows of the family Cyprinidae was made. Thirty species were recognized in the collection, and descriptions with notes on their life histories and habits have been prepared. Nearly all of these minnows are of importance because they constitute the chief food for many food and game fishes.

MARINE FISHES OF THE GULF COAST

Systematic studies of the fishes of the Gulf coast were continued by Isaac Ginsburg. Special attention was given to the families *Pleuronectidae*, *Gobiidae*, *Cyprinodontidae*, and *Syngnathidae*. In connection with this work the revision of a number of genera of American gobie is being prepared, which should be of help in placing the systematics of the *Gobiidae*, one of the most difficult families of American marine fishes, on a firm scientific foundation.

AN INVESTIGATION OF THE FISHES AND FISH CULTURAL POSSIBILITIES OF THE FRESH WATERS OF PUERTO RICO

An investigation of the status of the fishes of the fresh waters of Puerto Rico and the fish cultural possibilities existing there was undertaken by Dr. Samuel F. Hildebrand in cooperation with the Insular Department of Agriculture and Commerce. The principal fresh waters of Puerto Rico consist of 5 main streams with tributaries and 6 permanent reservoirs. Fishes in general are scarce in these waters. The indigenous fresh-water fishes consist almost wholly of representatives of salt-water families that in the course of time have acquired a fresh-water habitat. These fishes disappear almost completely from the streams above an elevation of from 1,500 to 2,000 feet.

Food for fishes, consisting principally of crustaceans and insects, is abundant almost everywhere. The temperature of the waters at an elevation of 2,000 feet and higher is cool enough for rainbow trout, as it rarely exceeds 70° F. About 10,000 rainbow trout fry were hatched in the Loquillo National Forest from eggs received from the Division of Fish Culture through the United States Forest Service. Some 9,000 of these fry were liberated in streams within the forest while the remaining 1,000 were retained and fed principally on shrimps from the local streams. Whether the ones that were liberated have survived is not definitely known, but the ones retained and fed in captivity made fairly rapid growth.

Some bluegill sunfish (*Lepomis incisor*) and catfish (*Ameiurus melas*), presumably acquired through the New York Academy of Sciences, were introduced in two reservoirs in about 1913. These fishes have propagated and still are present in the two reservoirs in which they were introduced. A third species, one of the crappies (Pomoxis) also was introduced, and is said to have maintained itself, though it was not seen during the investigation. The introduction of temperate-zone fishes seems to have been so successful that more trout eggs and small bluegill sunfish (*Lepomis incisor*) and catfish (*Ameiurus nebulosus*) were sent during October and December 1934. The prospects that these American fishes will establish themselves are favorable, and it is hoped thereby to furnish sport and food for the people of Puerto Rico.

SHRIMP INVESTIGATIONS

The shrimp investigations have continued under the direction of Milton J. Lindner. As in the past, headquarters have been maintained in New Orleans, La., in offices furnished by the Louisiana Department of Conservation. Field stations have been located at the United States Fisheries Biological Station, Beaufort, N. C.; the Georgia Tidewater Commission, Brunswick, Ga.; and the San Patricio Canning Co., Aransas Pass, Tex. The Louisiana Department of Conservation; the Texas Game, Fish, and Oyster Commission; the Georgia Department of Game and Fish; and the San Patricio Canning Co. have continued their generous cooperation as in the past. Due to lack of funds, operation of the *Black Mallard* was interrupted on August 1, 1934. Operations of this vessel will be resumed for a brief period beginning January 1935.

In conjunction with the work of the Bureau the Louisiana Department of Conservation has been conducting a hydrographical survey of Louisiana waters under the direction of James Nelson Gowanloch.

The shrimp is the most valuable fishery resource of the South Atlantic and Gulf coasts. In 1932, the latest year for which statistics are available, the shrimp fishery, with a catch of over 88 million pounds and a value to the fishermen of over 2 million dollars, ranked sixth among those of the United States and Alaska. There are three species of shrimp that constitute the commercial catch, the common shrimp, *Penaeus setiferus;* the grooved shrimp, *P. brasiliensis;* and the sea-bob, *Xiphopenaeus kroyeri.* The common shrimp is by far the most important because it comprises at least 95 percent of the commercial catch.

From a commercial standpoint, the shrimp fishery is in better condition than it has been in the last few years. Indications are that the pack of canned shrimp during the 1934–35 season will be larger than in the past several years with the market price holding up well. A closer organization of the canners and more cooperation between them was noted during 1934. The inauguration of the inspection system under the Pure Food and Drug Administration and the work of the shrimp section of the National Canners Association have resulted in a much improved pack of shrimp. The increase in the pack probably will cause a similar augmentation in the total landings of shrimp.

Because of the importance of the common shrimp, the major efforts of the investigation have been directed toward solving the problems presented by this species. The length measurements and gonad examinations show that the common shrimp reach maturity and spawn within 1 year. Not many spent shrimp are found and no shrimp which can be interpreted as being 2 or more years old has been taken. It is assumed from this that the shrimp die after spawning and that very few, if any, survive to spawn the following year. The spawning of the common shrimp occurs throughout the spring and summer in the open sea or Gulf, and the shrimp after hatching and passing through the larval stages move into the inside waters. These warm shallow sounds, bays, bayous, and rivers serve as nursery grounds. The young shrimp grow very rapidly and by June or July, depending upon the locality, attain sufficient size to appear in the commercial catch. By September almost the entire catch is composed of young shrimp from the spawning of the preceding spring and early summer. With the cooling of the waters in the early fall and winter there is a definite disappearance of the larger of the young shrimp from the inside waters and in some sections of the coast from the customary outside fishing grounds which, with few exceptions, are usually near the mouths of the passes.

At Beaufort, N. C., Dr. J. S. Gutsell has continued his studies of the structure and development of the ovarian eggs of the commercial species of shrimp. This study is of importance in determining just when spawning occurs and if a shrimp spawns more than once. Sections of many ovaries, including a number from the common shrimp with spermatophores attached, have been microscopically examined.

Because so few of the common shrimp are taken with spermatophores attached and because of the method of attachment, it seems certain that the spermatophores are not present on the female until they are ready or very nearly ready to spawn. Therefore, the large eggs found in the enlarged ovaries of all shrimp of this species with spermatophores attached are believed to be not only fully developed but also in a mature condition ready for emission and fertilization. Examination of such mature eggs reveals certain definite and distinctive structures in the yolk. These are not artifacts for under favorable conditions they may be seen in fresh eggs immediately after removal from newly killed shrimp. By proper fixation and staining they may be preserved and studied in sections which afford a superior picture of conditions within the ovary. One type of cytoplasmic body does not appear until the eggs are fully grown. By means of it a substantially matured egg may be positively identified. This is of importance, for if examination of an ovary shows that this structure is present in the crop of large eggs it may be stated without any doubt that the shrimp is ready to spawn; thus, with proper sampling, the spawning season can be determined with precision.

In addition, Dr. Gutsell has examined a number of shrimp which appear to have recently spawned. From these studies he has secured ovarian characteristics which apparently are diagnostic of spent shrimp. This is a particularly important and valuable contribution. Dr. Gutsell is preparing a detailed report of these investigations which he expects to have completed before the end of the 1935 spawning season. The completion of the report is expected to terminate the study of this particular problem.

Mr. Anderson, during 1934, continued the sampling of the shrimp population along the South Atlantic coast aboard *Launch 58*. The territory sampled represents about 95 percent of the shrimp fishery on the Atlantic coast. For the purposes of this investigation, 9 outside and 2 inside stations were visited once each month and from 2 to 4 trawl hauls were taken at each station. The outside stations are from 35 to 50 miles apart and extend from Cape Romain, S. C., to Cape Canaveral, Fla. The stations were so chosen as to give a representative sample of the shrimp population at the more important fishing centers along this coast. At each station otter trawl hauls and plankton tows were made, surface and bottom temperatures recorded, and salinities determined. A representative sample of the shrimp obtained was measured, the development of gonads noted, and the numbers of each species of fish secured were recorded.

Confirmation of last year's data was obtained which indicated that the large shrimp disappear from the usual fishing grounds during the fall and winter along the Georgia and northern Florida coast. Similarly, confirmation was also secured for last year's data which indicated a progressive increase in size of the common shrimp from north to south along the Florida coast during the fall and winter. Four possible interpretations may be placed upon these phenomena:

1. There is a southward movement of the larger shrimp along the Florida coast during the fall and winter.
2. The larger Georgia and northern Florida shrimp move offshore during this period.
3. Due to heavy fishing in the summer and early fall, the larger shrimp are depleted along the Georgia and Florida coasts.
4. Combination of any two or all three of the above factors may be occurring.

As a possible means of interpreting these changes in the population of the shrimp on the South Atlantic coast, Mr. Lindner has been conducting racial studies at frequent intervals in four widely separated localities. Although these studies have not been completed, it has been found that there are differences in body proportions in the shrimp in different localities. A complicating factor arises in that these differences appear to be associated not only with locality but also with season of the year and age of the shrimp. An important discovery resulting from this study has furnished a means of distinguishing between 0 group and I group shrimp during the late summer and early fall.

Kenneth H. Mosher continued sampling the commercial catch of shrimp at Aransas Pass through the calendar year 1934. In 1933 the sampling was extended to include the commercial catch at four other Texas ports—Galveston, Palacios, Port Lavaca, and Port Isabel. The shrimp fishing at Palacios, Port Lavaca, and Port Isabel was so irregular that these three ports were disregarded in 1934, leaving only Aransas Pass and Galveston as regular sampling localities. During 1934, 20,516 shrimp were sexed, measured, and sexual maturity noted. Only 145 of the total measured were *P. brasiliensis* and only 71 were *Xiphopenaeus kroyeri*, or the two species taken together were only slightly over 1 percent of the total yearly sample. The remaining 20,300 shrimp were *P. setiferus*. In addition to the routine sampling, a number of the shrimp were weighed as well as measured in order to obtain the weight-length relationship.

After many unsuccessful attempts to keep shrimp alive for any length of time in various types of live boxes and aquaria, two pens were devised and placed in a small pond separated from Redfish Bay by a dike in which screened sluiceways were built to provide a current of water to the pond.

Early in December Mr. Lindner and Mr. Mosher initiated tagging experiments upon some shrimp placed in the pens. The celluloid disk or button tag was used. Although inclement weather caused the death of the shrimp a few weeks after tagging, the results were encouraging as it was evident that the shrimp were able to withstand the rigors of handling while being tagged. Mr. Mosher will continue these experiments as soon as the danger of freezing has passed.

Studies on the spawning and early growth of the commercial peneid shrimps have been continued by John C. Pearson. A unique discovery during the year was the recognition of the eggs of a peneid shrimp, probably *Penaeus setiferus*. These eggs, taken off the coast of Georgia on June 17, 1932, in surface plankton, appear to be the first peneid shrimp eggs to be secured in a pelagic state. The eggs were spherical in shape and possessed an extremely thin delicate membrane. The diameter of the eggs ranged from 0.38 to 0.42 millimeter. Within each otherwise transparent egg rested a well-developed nauplius, the length of which ranged from 0.21 to 0.26 millimeter. The capture of these eggs at the surface in water of 30-foot depth would indicate that the eggs were spawned relatively close inshore and that they are strictly pelagic, floating at the surface of the sea.

Nauplii, zoae, and mysis stages of the commercial peneid shrimps have been abundantly secured in many plankton collections off the coasts of Louisiana, South Carolina, Georgia, and Florida. Zoae and mysis stages of both the commercial shrimps, *Penaeus setiferus* and *P. brasiliensis*, are at hand and are being studied in detail with respect to morphological distinctions and oceanic distribution as to time and place. It is hoped that a report on the morphology and distribution of the young of these commercial shrimps can be completed during the coming year. Considerable material on the young stages of various noncommercial shrimps has also been collected with the studies of the commercial shrimps.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

The major salmon and herring investigations have been continued through 1934 with some restrictions and limitations as to territory covered. During the year three new investigations were established; namely, the Columbia River salmon investigation, the Washington coho salmon investigation, and a detailed statistical study of the catches of all species of salmon from 1897 to 1933 in Puget Sound, the Fraser River, and Swiftsure Bank. The most severe limitation of activity has occurred in Alaska where the investigations have been confined mainly to the species of most economic importance; namely, the red salmon and the pink salmon.

COLUMBIA RIVER SALMON INVESTIGATION

In July 1934, the Division of Scientific Inquiry was allotted the sum of $25,000 annually during a 10-year period for scientific studies and experiments relative to the salmon fisheries of the Columbia River. J. A. Craig, formerly engaged in a study of these fisheries, was placed in charge of the investigation. Mr. Craig is being assisted by A. J. Suomela, who has also had experience on the Columbia River.

The object of this investigation is to provide information and recommendations which will point the way to the conservation of these important fisheries and provide for their productivity in the future. With this purpose in mind, a comprehensive program for the investigation has been prepared.

The development of the lands in the Columbia River Basin has been attended with many activities, such as the construction of dams and irrigation diversions and the introduction of sources of pollution, which, coupled with the intensive commercial fishery, have placed a great strain on the salmon populations of this river. In order to obtain some measure of the effect of this strain on the abundance of these populations it is necessary to conduct a detailed analysis, on the basis of catch return per unit of fishing time and effort, of the catch statistics of the salmon fisheries. It is known that the "run" of blueback and chinook salmon into the Columbia River is composed of a great number of races, each spawning in different tributaries and having fairly definite times for entering the commercial catch. The statistical study should yield information regarding the status of these separate races, as well as that of the composite runs of these two species. The statistical analysis, therefore, becomes one of the most fundamental and important parts of the present program of investigation.

In order to secure exact information on (1) the location and extent of the spawning areas now available to the salmon, (2) the location and extent of the spawning areas which have been destroyed and the causes of their destruction, and (3) the general status of the salmon populations spawning in the Columbia River at the present time, a program of stream surveys has been undertaken. Field parties have been sent out to cover the entire Columbia River system as rapidly as possible in order to determine the above-mentioned facts. It is hoped to discover the present condition of these spawning areas and to bring out facts which will lead to their improvement and rehabilitation. The results of these surveys will also be a means of indicating which of the tributaries are suitable for transplanting or restocking projects.

The program for the investigation also calls for studies of the life history, habits, and homing instincts of the several species of salmon. All of these facts must be known in order to conserve the fishery properly.

During the period from July 1934 to January 1935, inclusive, a large number of catch records have been collected and their analysis carried forward with the aim of preparing a report on the indices of abundance of the chinook and sockeye salmon from 1905 to the present time.

The stream-survey parties, although handicapped by adverse weather conditions during a great part of the time while in the field, have covered parts of the Wenatchee, Entiat, Methow, and Okanogan River systems as well as Wenatchee, Silver, and Osoyoos Lakes.

PUGET SOUND SOCKEYE SALMON INVESTIGATION

The activities of this investigation in 1934 were continued on the basis of the previous year's program. Thousands of sockeye salmon fingerlings from the Birdsview hatchery were marked by the removal of two fins and liberated in each of three creeks tributary to the Skagit River. The object of this experiment was to determine something concerning the mechanism of the homing instinct in the sockeye salmon. If these fish are attracted to a stream by some property of the water in which they were reared they should enter that stream no matter whether they have traversed it before or not. On the other hand, if they return by some sense of geographical location they should return to the stream in which they were liberated even though they left it immediately.

With this theory in mind, 10,000 marked sockeyes were liberated in Bacon Creek, 10,000 in Day Creek, and 10,000 more in Diobsud Creek. All of these streams are tributary to the Skagit. Two enter this stream above Grandy Creek, where the fish were reared, and one below Grandy Creek. Different marks were used for each group of fish, and these fish were liberated at their natural time of migration. If it becomes evident that sockeyes will not return to a stream in which they were liberated at their time of migration and which they immediately left, additional experiments will be performed to find for what length of time it is necessary to hold fish in a stream in order that they become imbued with the urge to return to that stream.

Approximately 14,000 sockeye fingerlings were marked and liberated at the Quilcene hatchery. These fish were transferred from the Birdsview hatchery in the eyed egg stage. The marking was for the purpose of determining whether or not sockeyes will return to Quilcene, which is not a sockeye stream, after being reared there. The returning adults will be detected in the commercial catch in Puget Sound and so provide a check on their survival if none appear at Quilcene.

Scale samples from the commercial catch at Bellingham, Wash., were collected, and marked fish were secured in cooperation with the British Columbia investigators during the past fishing season.

Statistics of the sockeye salmon fishery were collected and tabulated during the first half of the year. In July J. A. Craig, who was in charge of this problem, was transferred to the Columbia River investigation and Dr. G. A. Rounsefell was placed in charge. Dr. Rounsefell, in collaboration with G. B. Kelez, was engaged in preparing a preliminary report on the statistics of the salmon fisheries of Puget Sound during the last half of the year.

WASHINGTON COHO SALMON INVESTIGATION

In January 1934 a new investigation on the coho salmon of Puget Sound and the coastal district of Washington was started under the direction of George B. Kelez. The purpose of this investigation was the determination of the life history and state of abundance of this species, which not only contributes materially to the commercial fisheries of this region, but also forms a large part of the catches of the recreational salt-water fishing.

A survey was made of the location and extent of the fisheries for this species and the location and size of the streams in which they spawn. During the early spring, sampling was carried on for yearling fingerlings resident in the streams, and the presence of fry hatched during the year was noted. Collections of scales from adult fish were made at Bellingham, Wash., at regular intervals during the months of June to September (through the cooperation of the Puget Sound sockeye investigation). Collections of scales from both immature and mature fish in sport-fishing catches and from adult fish in the commercial catches landed in Seattle from Cape Flattery and Puget Sound were also made. Through the cooperation of several fishing resort owners, records were obtained as to the abundance of various sizes of cohos in inside waters during the past season.

A series of marking experiments was undertaken to secure information on life history, homing instinct, and migrations of the species; the fingerlings being supplied through the courtesy of the Washington State Department of Fisheries. Twenty-six thousand fry hatched at the Samish station in February were marked during May by the removal of the adipose and dorsal fins and liberated in Friday Creek, a tributary to the Samish River. At the same time 10,000 fry from the Skykomish station (which is located on an independent stream system) were moved to the Samish station and marked immediately by the removal of the adipose and left ventral fins. These fish were also liberated in Friday Creek in an attempt to determine the effect of transplanting the fry on their choice of the stream in which they will spawn. A portion of the Samish fry, from which those marked in May were taken, were held in the Samish ponds until November, and an additional lot of 26,000 were marked at that time by the removal of the dorsal and left ventral fins. The comparative returns from the two Samish experiments are expected to demonstrate whether or not the additional period of pond rearing will contribute materially to the resistance of the fingerlings to disease and natural enemies. Because of the vigorous growth and low mortality exhibited by these fish during the period of pond rearing, the State department of fisheries has determined to continue this procedure next summer wherever practical at the rest of their stations.

STATISTICAL STUDY OF SALMON FISHERIES IN PUGET SOUND REGION

During the latter half of 1934, Dr. Rounsefell and Mr. Kelez, in charge of the red salmon and coho investigations on Puget Sound, collected a great mass of statistical data of the catches of salmon of all species by all types of gear in the Puget Sound region as well as from Swiftsure Bank and the Fraser River. This included daily lifts of salmon traps from 1897 to date, of daily seine boat deliveries both from Puget Sound and from Swiftsure Bank from 1912 to date, and individual gill-net catches of over half of all of the gill nets operating on the Fraser River from 1929 to date. Several important features of the fishery were so well covered by these data that a preliminary report was made entitled, "Abundance, seasonal occurrence, and development of the salmon fisheries of Swiftsure Bank, Puget Sound, and the Fraser River."

This report gives a brief summary of the history and development of each type of fishing gear, where it has been fished, and the numbers used. The earliest fishery was chiefly with gill nets in the Fraser. Later came traps and small inefficient purse seines in Puget Sound. The purse seines increased steadily in efficiency after the introduction of gasoline motors in 1903 until the present modern Diesel-powered boat was reached. The amount of fishing gear reached its peak during the World War, descended to a very low level from 1922 to 1924, and then increased slowly but steadily to date. The ocean fishing on Swiftsure Bank with purse seines began in 1911 and quickly reached large proportions.

Studies of the seasonal occurrence of each species of salmon showed that in the traps in Puget Sound the king salmon run very early, 50 percent being taken before the others have really commenced to appear. The red salmon run next, followed a month later by the pinks. The cohos and chums run later than the rest. In the purse seines in Puget Sound all species are taken somewhat later than in the traps. This is especially true of the chums. On Swiftsure Bank most of the species are taken at the same time as in Puget Sound, with the exception of the cohos. Large schools of feeding cohos in their third year that are only half as large as they would be if caught later in the season are purse seined early in the season. The number of cohos on the bank fall off as the catches of larger cohos increase inside of Puget Sound. In the Fraser River the season is somewhat more extended than in Puget Sound and the fish appear to run later.

A detailed study of abundance shows that the red salmon, although not as abundant in the " big " year cycle as formerly, appear on the whole to be increasing gradually since the low point reached during the period 1920 to 1925 resulting from the combination of overfishing during the World War, and the blockade of most of the spawning grounds in 1913 and 1914 by the slide in Hell's Gate Canyon.

The coho salmon are less abundant at present than at any time since the beginning of the fishery. It appears that they are in need of more stringent protective regulations.

The pink salmon, although maintaining a fair level of abundance since 1915 are in no wise as abundant as in 1911 and 1913, before the slide of 1913 in Hell's Gate Canyon completely wiped out the population spawning in the Thompson and Nicola Rivers and the tributaries of Seton and Anderson Lakes.

KARLUK RIVER RED SALMON INVESTIGATION

The Bureau of Fisheries early realized the necessity of obtaining information on the number of red salmon that should be permitted to spawn in the streams in order to produce returns that would provide the maximum surplus for the fishery. Since this involved a study of the complete returns from known spawning escapements, a stream had to be selected where both the portion of the run taken for commercial purposes and the portion escaping to the spawning grounds could be determined. The Karluk River on Kodiak Island was the first stream selected for this study since it supports a large red salmon population which is subject to commercial capture only in the vicinity of its mouth. Furthermore, the Karluk River is centrally located in a large red-salmon-producing area, and it was hoped that the fundamental facts secured from the study of its fishery could be applied generally to the fisheries of the other red-salmon-producing areas in Alaska. This investigation has been carried on continuously each year since its inception in 1921, and at the present time is being conducted by J. T. Barnaby, assisted by L. D. Townsend.

The information available to date on the returns from known spawning escapements in the Karluk River indicates that wide fluctuations may be expected in the rate of reproduction of its spawning populations. During the past year a complete analysis was made of the returns from the known escapements of 1921 to 1928. The escapements for these years are as follows: 1921, 1,500,000; 1922, 400,000; 1923, 694,579; 1924, 1,000,000; 1925, 1,620,927; 1926, 2,533,402; 1927, 872,538; and 1928, 1,093,817. The ratio of return to escapement for these years is as follows: 3.0 to 1, 5.6 to 1, 2.9 to 1, 0.8 to 1, 1.0 to 1, 0.6 to 1, 1.8 to 1, and 2.1 to 1, respectively. The smallest escapement, 400,000 fish, produced the greatest return per spawning fish, 5.6 to 1, whereas the largest escapement, 2,533,402 fish, produced the smallest return per fish, 0.6 to 1. In other words, there seems to be little opportunity of selecting a spawning escapement that will consistently produce a large population.

In 1926 a series of marking experiments were established for the purpose of determining the mortality of the red salmon during their life in the sea. These experiments have consisted of the marking of 50,000 seaward migrants each spring. The proportion of the adult salmon bearing the marks that have returned from each experiment indicates that although the mortality in the sea is considerable it seems to remain fairly constant from year to year. However, the rate of growth of the salmon in the ocean varies considerably and is responsible for the length of time the fish from different brood years remain in the ocean before returning to spawn. Obviously, salmon staying an extra year in the ocean before returning to spawn are subject to a greater mortality since they are exposed to the factors which affect their mortality for an additional year's time. Hence the wide fluctuations in the rate of reproduction of the spawning populations may be due in part to fluctuations in their ocean mortality.

Evidence was secured during the past season which indicates that changes in the natural conditions in the streams and lakes during the spawning period and early development of the salmon can bring about wide fluctuations in their mortality. In fact, the relatively poor returns from the escapements of 1924 to 1928, inclusive, are probably due to the abnormal conditions which were observed on the spawning grounds in 1924 and 1926. Hence it is believed that the varying rate of reproduction of the spawning populations may be traced largely to the success or failure of the spawning salmon and the death rate of the ensuing young during their existence in fresh water. Therefore, the program for this investigation in the future will include an intensive study and evaluation of the factors which influence the success of each year's spawning population and the mortality of the brood from the egg stage to the time it migrates to the sea.

CHIGNIK RIVER RED SALMON INVESTIGATION

The activities of this investigation during the past year were greatly reduced owing to the transfer of its personnel, Messrs. H. B. Holmes and G. B. Kelez, to other Bureau investigations.

A temporary assistant was stationed at Chignik from May until October for the purpose of collecting fish-scale samples and the observation of the commercial catches for marked fish. The data collected have been filed for future use.

BRISTOL BAY RED SALMON INVESTIGATION

Although funds were not available for a biologist to carry on field work in Bristol Bay during the past year, scales of the 1934 red salmon populations in this area were collected through the cooperation of the Alaska Division of the Bureau. Scale samples and body measurements of the red salmon which spawn in the Bristol Bay region have been accumulating for a number of years. Funds have been requested for the development of this important field of work, and it is hoped that they will become available in the near future.

PINK SALMON INVESTIGATION

The pink salmon are found in practically all the waters of Alaska but are most abundant in the southeastern section. Millions of pink salmon spawn in this section each season in its hundreds of streams which vary greatly both in size and character of habitat. The Bureau of Fisheries through its conservation policy, which was made possible by the White law, has been able to build up the pink-salmon populations of southeastern Alaska to a state where they are fluctuating near their maximum level of abundance. In fact, the commercial catch of pink salmon in this section during the past season was the greatest in the history of the fishery. This, however, does not imply that these populations of salmon are no longer in need of constant observation for past experience has shown that they are subject to serious injury due to changes in both economic and natural conditions regardless of their state of abundance. Hence to secure information in regard to the changing status of these salmon populations which will lead to their conservation so as to provide for a permanent and productive fishery is the primary aim of the pink-salmon investigation.

The activities of this investigation in 1934, as in past years, were confined to a study of the pink-salmon populations in southeastern Alaska. Owing to the varied environmental conditions under which the pink salmon reproduce in this section of the Territory, it is believed that the fundamental facts secured from the study of its fishery may be applied generally to pink-salmon fisheries of Alaska. Dr. Frederick A. Davidson is in charge of the investigation, assisted by S. J. Hutchinson.

A paper on the homing instinct and age of maturity of the pink salmon was published during the past year. The evidence to date indicates that the pink salmon have a great desire to return to spawn in the streams from whence they came, but that some straying of the adults may occur in localities where a number of streams are in close proximity to each other. The evidence thus far collected also indicates that the pink salmon have a complete 2-year life cycle, that is, they invariably return to spawn at the close of their second year of life. The results from the racial analysis of the pink salmon which have been completed to date, substantiate the evidence in regard to the age of maturity of the pink salmon. These results indicate that 2 distinct salmon populations are found in the streams, 1 that spawns in the odd years and 1 that spawns in the even years.

A continuous study is being made of the yearly fluctuations in the abundance of the pink salmon in southeastern Alaska beginning with the inception of the industry in 1895. The results from this study show that wide fluctuations may be expected in the yearly abundance of these salmon. Since the pink salmon have a complete 2-year life cycle, the number that return to spawn any year is the result of a single spawning brood and not of several broods as in the case of the red salmon. Hence a marked change in the mortality of any brood is directly reflected in the number of salmon that return 2 years later. Knowing the disastrous effects that lack of rainfall during the spawning period can have upon the success of a spawning population, it is not surprsing to find these wide fluctuations in the yearly abundance of the pink salmon. The amount and time of occurrence of rainfall, however, are not the only factors which influence the mortality of the spawning salmon and subsequent brood. Hence a study is being made for the purpose of determining and evaluating all of the factors which influence the mortality of the salmon during their entire cycle of reproduction.

This study was started in the stream at Olive Cove, Alaska, but owing to handicaps encountered there it was transferred to the stream at Little Port Walter in the summer of 1934. The stream at Little Port Walter provides a very satisfactory location for this study.

It is only three-fourths mile in length, and the varied character of its stream bed provides for the study of practically all the types of spawning grounds found in the streams in southeastern Alaska. Furthermore, all of the commercial fishing which affects its salmon population is carried on just outside of the port and can readily be accounted for. Plans are being made for the construction of a permanent counting weir in the stream wherein both the adults that migrate into it to spawn and the resulting fry which migrate to the sea may be counted accurately. In this way both the mortality of the brood while in the streams and in the sea may be determined. It is hoped that funds will be available for a permanent observer at the stream for the purpose of making continuous observations of the environmental changes in the stream so as to determine the natural factors which influence the mortality of the brood. Once equipped with knowledge of the factors which influence the mortality of the broods, the Bureau will be able to develop further its conservation policy so as to provide for the most efficient utilization of the pink-salmon populations.

HERRING INVESTIGATION

With the exception of a few minor localities, the herring fisheries of Alaska may be grouped into four districts; namely, southeastern Alaska, Prince William Sound, Kodiak-Cook Inlet, and the Aleutian Islands. The fishery of southeastern Alaska is by far the most productive, and at the present time is supporting the majority of the fishing effort. Hence the activities of the herring investigation during the past year were confined mainly to a study of the fishery in this region. Dr. G. A. Rounsefell, who has been conducting the investigation since 1925, was transferred to the Puget Sound sockeye-salmon investigation in July owing to the need of a trained investigator for this work. E. H. Dahlgren, who has assisted Dr. Rounsefell for a number of years, was placed in charge of the investigation.

The stock of Alaska herring, being separated into a series of local races, presents a more complex problem than would be the case if it were a homogeneous population. The delineation of these races and a measure of the intermingling which takes place between stocks is of utmost importance. Estimates of changes in abundance and causes for such changes are dependent on this separation. Observations on the size and age compositions of the catch have clearly demonstrated the existence of dominant year classes, but the determination of the exact causes for such varying degrees of success of different spawning is yet to be solved.

A racial report now in press, by Dr. Rounsefell and Mr. Dahlgren, entitled "Races of Herring, *Clupea pallasii*, in southeastern Alaska", presents the progress already attained in the problem of the segregation of populations. The results of an analysis of vertebral counts and of growth rates, the comparison of proportional representations of year classes, and the recovery of tagged herring are presented in this paper. The separation of the herring populations in the vicinity of Petersburg and Noyes Island, and the localities east of Clarence Strait and south of Sumner Strait, including Wrangell, was made evident by comparisons of the means of the vertebral counts. Size frequencies of age classes show that the herring of Noyes Island, Douglas Island-Icy Strait area, Affleck Canal, and Peril Strait are much slower growing than those of other localities. Age distributions support the analysis of vertebrae and growth rates, in separating the populations of Noyes Island, Peril Strait, and the Douglas Island-Icy Strait areas from neighboring localities. The recovery at Cape Ommaney of tags affixed to spawners at Sitka demonstrated the relation between that spawning ground and the summer feeding area. The failure to recover any of the tags affixed at Cape Bendel in Frederick Sound gives negative evidence to show lack of intermingling of these fish at the feeding grounds in lower Cape Ommaney with the other populations.

Further experiments in the tracing of migrations by tagging were carried out during the spring of 1934. Twenty-one thousand five hundred and sixty-one metal belly tags were affixed to spawners at two of the major spawning areas, 8,394 at Craig on the outside of Prince of Wales Island, and 13,167 at Sitka, on Baranof Island. On 18,368 of these, a tag modified from those of previous years was used, the change consisting of having the tag stamped from steel, then plated with nickel, and in increasing the size to about double that of the nickel tags used previously. The larger size makes the tagging easier and faster. Corrosion, which might be expected to occur when there are imperfections in the plating, did not take place in the body cavity of the fish, and tags recovered 6 months after tagging showed their original luster. The 3,193 others were tagged with pure nickel tags left over from the 1933 experiment.

By means of the electromagnets installed at the reduction plants, 153, or 2.1 percent, of the steel tags affixed at Craig were recovered as against six-tenths of 1 percent of the nickel tags from the same experiment. Recoveries were made largely from the Warren and Noyes Island areas, although a small percentage were reported taken from Cape Ommaney. The Noyes Island and Warren Island fish are thus shown to be of the same population. Four hundred and eighty-eight, or 4.4 percent, of the Sitka steel tags and 40, or 1.8 percent, of the nickel tags at Sitka were recovered. They were taken, as were those of the 1933 experiment, from the vicinity of Cape Ommaney. A small fraction of these recoveries were made at the Warren-Noyes area. The degree of intermingling of the Cape Ommaney and Warren-Noyes Island populations, first indicated in this experiment, cannot be measured accurately until a device is perfected to extract the tagged individual before being run through the reduction plant. Such a unit has been devised and will be given a trial during the coming year.

Biweekly samples of the catch taken during the 1934 season in southeastern Alaska indicate a great predominance of 4-year-old individuals. As a result of the population being so young a relatively small pack of cured fish was prepared, a condition which may be expected to continue during the 1935 season. If this year class is not too seriously depleted, it should yield a good pack in 1936 due to the increased size of the herring.

Samples of the catch in Prince William Sound were collected, adding an additional year's data from this region. Sampling at Dutch

Harbor, carried on in previous years through the cooperation of the Alaska Division, was discontinued for lack of funds to analyze the data.

INVESTIGATION CONCERNING THE PROTECTION OF MIGRATORY FISH AT THE BONNEVILLE DAM

The future of the salmon, sea-run trout, and other anadromous fish of the Columbia River is endangered by the Bonneville Dam, which is being constructed by the War Department as a part of the Public Works program. This dam will obstruct the main Columbia below the tributaries that furnish the bulk of the spawning areas. The run of fish involved supply a great part of the sport fishing of the inland region of Oregon, Washington, and Idaho, as well as support a commercial fishery whose annual yield is valued at several million dollars. The task of designing fishways for the Bonneville Dam, therefore, becomes the most important undertaking of its kind ever attempted.

When the United States Army engineers started preparing detailed plans for the structures, they called upon the Bureau of Fisheries for recommendations relating to fishways. Such recommendations could not be furnished without a detailed study of the situation. In fact, the magnitude and importance of the task demanded consideration of new features in fishways. A portion of the funds allotted to the Bonneville project, therefore, was assigned to the Bureau of Fisheries for its investigations.

Harlan B. Holmes was placed in charge of the investigation. Henry F. Blood, a prominent engineer of Portland, Oreg., was employed to assist with the engineering phases. Other temporary employees have assisted with various biological and engineering phases of the work. The investigation has been conducted in close contact with the designing staff of the United States Army engineers, a committee representing the fishing interests, and the State fish and game departments.

The investigation has involved (1) an analysis of commercial fishery catch records and information from other sources for the purpose of estimating the time and magnitude of the runs of fish; (2) a familiarity with the physical features of the dam and power-house structures; (3) a historical study of the seasonal variations in the flow of the river, and the effects of these fluctuations upon the operation of fishways; (4) an extensive study of fishway principles including a survey of fishways now in use or previously tried, principles that have been proposed but never put into practice, and the development of new features; and (5) finally upon the basis of these investigations the presentations of detailed recommendations for fishway structures.

The investigation was started in November 1933, and some phases are not as yet completed. Tentative conclusions have been made available to the designing staff of the United States Army Engineers as rapidly as they become available. Formal recommendations for fishways for upstream migrants were submitted to the War Department in August 1934. Details and other features pertaining mainly to the passage of downstream migrants and the passage of fish during the period of construction are being considered as rapidly as possible.

The fishways for upstream migrants recommended by the Bureau of Fisheries include 3 fish ladders, 5 fish locks, and 3 units of a new feature known as a "collecting system." The fish ladders are of special design to adapt them for wide ranges of variation in tailrace and forebay fluctuation. The fish lock, which is new in application to salmon and trout, embodies the essential principles of a navigation lock with minor differences to adapt it to the special use. The collecting system consists of a series of entrance weirs distributed at various points along the obstruction, all entrances communicating with a common passage which leads to the base of the fishway proper. The quantity of water flowing through the common passage is augmented by an auxiliary water supply, thus presenting as an attraction to the fish a much larger quantity of water than can be supplied by the fishway proper. The collection systems are recommended for use both with the fish locks and the fish ladders.

GREAT LAKES FISHERY INVESTIGATIONS

Owing to the continued curtailment of the Budget, no field work was conducted on the Great Lakes during the calendar year 1934. The Great Lakes research conducted under Dr. John Van Oosten was confined entirely to work in the laboratories furnished by the University of Michigan at Ann Arbor.

As in past years, the Bureau continued its cordial relations with the various Great Lakes States and provided them, whenever possible, with information and advice concerning their respective fisheries. Dr. Van Oosten represented the Bureau at various fisheries conferences on the Great Lakes as well as at the public hearing called by the National Recovery Administration at Muskegon, Mich., on April 25 to discuss the proposed Great Lakes fisheries code.

Much progress has also been made in what is often considered the more scientific aspect of fisheries research. The analysis of fisheries statistics begun on Lake Huron has been extended to Lake Michigan and Lake Erie. Life history studies of the whitefish, cisco, perch, yellow and blue pike-perch, and sauger of Lake Erie are nearing completion. It is planned to extend these important investigations to the other lakes of the Great Lakes chain.

FISHERY STATISTICS

The intensive statistical study of the commercial fisheries of the Great Lakes waters of the State of Michigan begun in 1933 was continued through 1934. Complete and detailed data are now available for the Lake Huron fisheries over the 5-year period, 1929–33. Similar statistical analyses have been started for the commercial fisheries of the Michigan waters of Lake Erie and Lake Michigan. In a brief preliminary publication, Dr. Ralph Hile and William R. Duden described the methods employed in these statistical investigations.

The statistical data on the commercial fisheries of Lake Huron have proved particularly valuable in their application to the problems relative to the use of the deep trap net for the capture of whitefish. This new type of gear, which was introduced into Lake Huron in 1928, proved so very effective and its use expanded so rapidly during the succeeding years as to create grave fears concerning the future of the fishery. The Bureau's statistical data based on a study of the Lake Huron fisheries by geographical districts and over a period of 5 years, showed these fears to be well grounded. According to the Bureau's data, the history of the deep trap net fishery in a single fishing district may be described approximately as follows: The introduction of the deep trap net into a fishing area is followed by an immediate rise in whitefish production to a point far above the normal. This increased production continues over a period of 2 years, although a drop in the catch per unit effort may be detected in the second year of the use of the trap net. The third year sees a marked drop both in total production and in catch per unit effort.

The statistical evidence supplied by the Bureau that the use of the deep trap net occasions a rapid and severe depletion of the whitefish stock was directly instrumental in the securing of legislation regulating and restricting the use of this destructive gear. The publication of a complete report on the statistics of the commercial fisheries of Lake Huron is being delayed pending the analysis of the 1934 material.

PIKE-PERCHES

The racial and life history study of the three species of pike-perches (*Stizostedion*) of Lake Erie with which H. J. Deason has been occupied has progressed toward completion. Scale samples from 8,390 fish (2,812 yellow pike-perch, 3,441 blue pike-perch, and 2,137 saugers) have been mounted, aged, and measured during the course of the study. Lengths to the end of each year of life and annual increments of growth have been calculated and summarized in tabular form. Some conclusions of this work were given previously (Progress in Biological Inquiries, 1933), in which only a portion of the above material was employed.

Because of the necessity of correcting certain fundamental errors inherent in the application of the scale method of growth determinations to pike-perches, it was found desirable to devote some time to the basic assumptions of the scale theory insofar as they applied to these species of fish. This study dealt largely with the variations involved in the proportionate growth of the body of the fish and its scales. As a result of this study it was possible to secure more accurate data on the rate of growth of the various species.

The racial study of the pike-perches is concerned with the systematic relationship between the blue and yellow pike-perches, principally those of Lake Erie. A total of 1,038 preserved specimens have been examined and measured, which number is made up as follows: 449 blue pike-perch from Lake Erie, 52 blue pike-perch from Lake Ontario, 230 yellow pike-perch from Lake Erie, and 307 yellow pike-perch from Saginaw Bay in Lake Huron. The Lake Ontario and Lake Huron materials were employed in order to study the variation in a single species from different bodies of water. At the beginning of this study some 30 counts and measurements were made on each fish, but as the work progressed and it became increasingly evident that some of the counts and measurements were valueless those proving not trenchant were dropped. Only 7 measurements and 2 counts (lateral line scales and number of vertebrae) were retained as indicative of possible racial differences.

Small average differences betwen the blue and yellow pike-perches of Lake Erie have been noted, but the percentage of overlap is great. Differences between the blue pike-perch of Lake Erie and those of Lake Ontario are as great as are the differences between the yellow pike-perch of Lake Erie and those of Lake Huron. In distinguishing the blue from the yellow pike-perch in Lake Erie the color and growth rate afford the best criteria. In Lake Erie these two species have a different distribution, constitute distinct fisheries units, and because of differences in growth rate and average size have different legal size limits. From the standpoint of law enforcement it would be most advantageous to have absolute morphological criteria which would differentiate the two species, but these apparently do not exist. Further work on the racial question must include the age determination of all specimens and a study of morphological variations with growth rate and with year classes.

YELLOW PERCH

F. W. Jobes continued the study of the life history of the yellow perch. Up to the present time scales of nearly 5,000 perch have been analyzed for age and growth rate. The perch material was exceptionally well adapted to an investigation of the growth relationship between the body of the fish and its scales. As a result of this work a better conception will be obtained concerning this most difficult problem that confronts nearly every investigator of the life history of fishes.

OTHER OUTSTANDING PROBLEMS

Although some of the most controversial of the practical problems on the Great Lakes, such as the proper mesh in trap nets and pound nets, destructiveness of chub nets to trout, regulation of deep trap nets, method of measuring mesh in gill nets, size limits of fish, and pollution, have been solved, much remains to be done. The controversial question of the destructiveness of hooks and bait nets to immature fish needs investigation. Further experimental work should be done on the proper mesh of gill nets employed in Lake Erie. A satisfactory method for measuring the mesh of heavy twine must be developed.

UNIFORM REGULATION AND DEPLETION

One of the most urgent needs on the Great Lakes today is concerted action by the various Commonwealths, both in this country and in Canada, to regulate and protect the commercial fisheries of the Great Lakes. Since 1927 the Bureau has cooperated with the various Commonwealths in some 10 interstate and international fisheries conferences. During this period the Bureau, in cooperation with various State conservation departments, has concentrated its scientific research on the Great Lakes on those controversial practical problems that previously had prevented enactment of uniform regulation. In spite of the vast amount of scientifically collected data available to support the recommendations adopted at the conferences, little progress has been made in the enactment of the recommendations into laws.

The necessity of uniform regulation is obvious from the fact that, in many cases, fishermen from 2 States or 2 countries depend on the same population of fish. Lack of uniformity not only causes much unfair competition between fishermen of adjoining States but also fails completely to give the fish the necessary protection. Twelve species of fish have been either exterminated or seriously threatened. The blackfin bloater and salmon of Lake Ontario have been completely exterminated. The sturgeon, blackfin, chub, and Lake Erie cisco no longer support a commercial fishery. The other six species of chubs are severely depleted, and the whitefish is seriously threatened with commercial extinction. The final result of continued lack of uniform regulation appears to be obviously indicated by what has happened in the past.

OYSTER INVESTIGATIONS

The investigation of various problems relating to oyster culture was carried out in all of the principal centers of the oyster industry of the Atlantic and Pacific coastal States and the Gulf of Mexico. As compared with the previous year, the work was expanded by an experimental study of the oil-pollution problem in Louisiana waters in cooperation with the State Department of Conservation. Preliminary surveys made in 1933 clearly indicated the necessity of conducting a comprehensive investigation of this important problem.

The United States fisheries laboratories at Woods Hole, Mass., Beaufort, N. C., and Washington, D. C., served for laboratory investigations. The Bureau's field stations at Milford, Conn., and Olympia, Wash., were used as headquarters for field investigations and experiments on the cultivation of oysters. In both places the work was carried out in cooperation with the State authorities.

This work is being conducted under the supervision of Dr. Paul S. Galtsoff.

EXPERIMENTS ON OYSTER CULTURE

Experiments on oyster culture were continued by Dr. Galtsoff and V. L. Loosanoff at Milford, Conn., in cooperation with the Connecticut Shellfish Commission and the Connecticut Oyster Farms Co. During the summer the State's boat, the *Shellfish*, was used for field work in Long Island Sound, while during the cold season the research work was dependent upon the facilities offered by the Connecticut Oyster Farms Co. All of the laboratory work was carried out at the Osborn Zoological Laboratory, Yale University, and at the United States fisheries laboratory, Woods Hole, Mass. As in previous years, much needed information was supplied to the oystermen regarding the expected time of spawning and setting. On several occasions, at the request of the United States War Department, Mr. Loosanoff assisted in examining the oysters and oyster grounds in New Haven Harbor to determine the effect of the dredging operations conducted by the United States Corps of Engineers. On many occasions the oyster growers of the district called upon the laboratory at Milford for information and advice concerning various problems of oyster culture.

The major part of the work was a continuation of the investigation on the growth and fattening of oysters started by the Bureau in the spring of 1932. It consisted mainly of a study of environmental conditions and seasonal changes occurring in oysters. By comparing the temperatures of the water for the last 3 years, two points of great biological interest and significance become apparent: First, the duration of the hibernation period and the activity of the oysters vary, but within very narrow limits. During the years 1932, 1933, and 1934 the oysters hibernated 155, 160, and 149 days, respectively; second, the spawning period, that is, the number of days per year when the temperature of the water remained above 70° F., was 42 in 1932, 69 in 1933, and 59 in 1934. It is interesting to note that the shortest period of hibernation occurred in 1934 regardless of the temperature during this year. The spawning period of 1932 constituted only about 60 percent of that in 1933.

From the observations on phosphates it becomes evident that the utilization and regeneration of these nutrient salts in Long Island Sound is a definite cyclic process with a minimum amount present in the water during the warmest part of the year and a maximum amount occurring in winter. The temperature of the water and solar radiation are the two principal factors controlling the phosphate cycle, which in turn determines the fluctuations in the abundance of plankton. Analysis of river water showed that it is very poor in phosphates and contributes very little to the phosphate reserve of the Sound.

Observations on the growth of oysters show that they continue to increase in length and weight throughout the entire year, including the winter months. The rate of growth gradually decreases with age. In 1932 the average increase in length of 4-year-old oysters planted on experimental beds at Charles Island was about 2 cm, in 1933 it amounted to 0.9 cm, and during the last year it did not exceed 0.5 cm. Changes in the increase in total weight are even more striking. In 1932 the increase in total weight of 4-year-old oysters was 72 percent, in 1933 it was only 40 percent, and during the last year less than 10 percent. Thus, the self-inhibiting phase of growth—that is, the phase during which the rate of growth decreases with the increase in size or weight of the organism—is very pronounced in the 6-year-old oysters. The weight of the shells of oysters examined during the year constituted from 72.9 to 82.5 percent of total weight, the average, 77 percent, being almost identical with that obtained in 1932 and 1933.

During the year the weight of the meat constituted from 10 to 13 percent of total weight, the minimum occurring after spawning; that is, in August–September.

Observations on the glycogen and mineral content of the oysters were continued. Of the 199 samples of oyster meats collected during the course of the investigations 45 were analyzed for iron, copper, manganese, and zinc.

Observations on the spawning of oysters made by P. S. Galtsoff and J. F. Reppun at Woods Hole disclosed some interesting details of this process. It has been found that the eggs of an ovulating female pass through the gills and are discharged from the inhalent chamber instead of being expelled directly with the outgoing current of water passing through the cloaca. Because of this peculiar manner of shedding, the eggs are more uniformly distributed in the water and have a better chance to meet with the sperm. Experiments with artificial stimulation of spawning produced interesting results, showing that male oysters can be induced to shed sperm by a great variety of organic compounds, as, for instance, various hormones (thyrosin, theelin, two extracts of pituitary gland), sugars, peptone, egg albumen, sperm of various mollusks, and even yeast. The reaction of the female is, however, very specific; it can be induced only by the sperm of the oyster.

OIL-POLLUTION INVESTIGATIONS IN LOUISIANA

In an attempt to carry out a more comprehensive study of the oil-pollution problem in Louisiana, where a serious mortality of oysters occurred in 1932–33 coincident with the development of oil wells, the Bureau obtained from the Civil Works Administration an approval of a project to carry out both field and laboratory experiments in the affected territory. Unfortunately, out of the $42,000 allotted for this purpose only $3,000 were made available to the Bureau, and after the completion of a preliminary hydrographic survey of Timbalier and Terrebone Bays and adjacent bodies of water by R. O. Smith, the work in Louisiana was discontinued. Laboratory experiments were carried out, however, by H. F. Prytherch and R. O. Smith at Beaufort, N. C., and P. S. Galtsoff and V. Koehring at Woods Hole and Washington. Although the exact cause of the mortality of oysters had not been determined, the results of the laboratory experiments throw light on the possible effect of oil pollution on oysters. The report of this work has been submitted for publication.

The laboratory experiments were designed to test the effect of crude oil and oil-well bleed water on the vital activities of the oyster, especially on the rate of feeding, and on the growth of diatoms which constitute the principal food of the oyster. Using a method developed by Galtsoff in his previous studies on the physiology of feeding, hundreds of records were obtained showing the effect of the presence of oil on the rate of pumping of water through the gills. The results of these observations show that crude oil contains certain soluble in the sea water substances which inhibit the activity of the ciliated epithelium of the gills and reduce the amount of water which the oyster passes through the gills. This toxic effect is proportional to the concentration of the water soluble fraction of crude oil. It is of interest that repeated washing of one sample of oil seems to have no effect on toxicity of the extract, for samples of it obtained from oil that had been washed 28 times were as toxic as those prepared from a new sample. Oil extracts have no effect on the adductor muscle and oysters kept under oil or in running sea water which was allowed to pass through a layer of oil remain open for the same periods of time as the controls. But the ciliary epithelium is very sensitive to the oil extract which inhibits its action. Since the oyster feeds on minute plants suspended in water, the rate of feeding is directly proportional to the volume of water pumped through the gills.

There is no doubt that the presence of oil decreases the rate of feeding of oysters, and oil absorbed by colloidal clay and deposited on mud bottom may exert its adverse effect on oysters long after all traces of it have disappeared from the surface of the water.

Oil-well bleed water has an effect on oysters similar to that of the oil extract.

Experiments with the diatom *Nitzchia dosteria*, grown under controlled laboratory conditions, show that the rate of propagation is decreased by oil floating on the surface of the experimental flask and by the addition of oil extract. From the results of the laboratory experiments an inference can be drawn that both factors, the decrease in the rate of feeding of oysters and the diminished production of diatoms, create conditions adverse to the cultivation of oysters in the oil-polluted areas.

BIOLOGY AND CULTIVATION OF HARD-SHELL CLAM (VENUS MERCENARIA)

While certain phases of the life history of *V. mercenaria* are quite well known, chiefly through the work of Kellogg and Belding, much is still left to be learned about this animal, and there is a growing demand for the information regarding the methods of its cultivation. The aim of the study being conducted by V. L. Loosanoff at Milford, Conn., is to obtain a broad knowledge of its life history, habits, and physiology, and to develop practical methods of propagation. It is expected that the results of this investigation will be instrumental in devising methods for increasing the natural supply and for the preservation of the clam fisheries.

At present, the study is confined to the following phases: Development and seasonal changes of gonads, spawning, development of the egg, growth, and feeding.

The work along the first line consists in histological and cytological studies of the material collected at regular intervals from the experimental clam beds near Milford, Conn. The study is not quite completed. It appears from the material examined so far that the primary gonads of young clams are of protandric nature, that is, the individuals first pass through the male phase. Whether the *Venus mercenaria* is strictly protandric or some of the individuals mature as females without the completion of a preliminary male phase will be established upon the examination of more material. Young clams 6 to 7 mm long already contain apparently functional spermatozoa.

Studies of the seasonal changes in the gonads of adult clams reveal processes which differ markedly from those observed in the oyster. In the latter, after spawning is completed the gonad tissue is absorbed, so that in the winter the gonads are in a well defined resting stage. In Venus, a certain amount of absorption is also evident, the principal degeneration of unspawned eggs taking place in December, but the gonad follicles do not shrink noticeably, and well developed ovocytes are always present. In the male the situation is still more amazing. Active spermatozoa are present in every month of the year. Upon being placed in the water they swim actively and behave in normal fashion. One interesting observation has been made on the movements of spermatozoa. During the study of fertilization it has been observed that sperms of different clams do not behave similarly. While they all exhibit spiral movements, the spermatozoa of about 75 percent of males move in circles in an anti-clockwise direction, while the other 25 percent of the males produce sperms moving in the opposite direction. The sperms of one male usually all move in the same direction. On several occasions young ovocytes were found present in adult males 6 to 8 years old. This apparently shows the potentiality for change of sex even in adult clams. However, gonads of truly bisexual character in an adult clam have been observed in one case only. Functional hermaphroditism has been observed only once.

A study of the spawning of clams and its physiology was conducted last summer. It has been found that it is very difficult to induce the spawning of clams, especially females, under the laboratory conditions. The critical spawning temperature is higher than that required for the oyster. Under the laboratory condition 25° C. was the minimum spawning temperature.

To study the growth of young clams three experimental beds representing different environmental conditions were established in different parts of Milford Harbor. Young clams from all of the beds were measured at regular intervals and the progress in growth recorded.

The feeding of clams depends upon the combined action of syphon, gill epithelium, and adductor muscles. At present only shell movements are being studied. The clams are kept under natural conditions in the large concrete tanks, 20 by 18 by 6 feet, in which the water is renewed by tidal action twice each day. Since the beginning of the experiment on October 17, 1934, over 160 records of shell movement have been obtained covering the range of temperature from 0° C. to 13° C.

A study of the glycogen content of hard-shell clams was begun last March. Samples of clams were collected every 2 weeks and the meats analyzed. The glycogen content varies greatly with physiological changes occurring in the clams at different seasons of the year. The maximum quantities of glycogen found in clams during the prespawning period constituted 10 to 11 percent of the meat weight (fresh basis). After spawning a very sharp drop takes place until at times it equals only 3.3 percent of the meat weight. Gradual recovery takes place after that and during the winter the glycogen content of the clams constitutes 6 to 9 percent of total weight. Grown under similar conditions clams always have a higher glycogen content than the oysters.

REHABILITATION OF PUBLIC OYSTER BEDS IN NORTH CAROLINA

In order to restock the depleted natural oyster beds of North Carolina, extensive operations for the transplantation of seed oysters have been carried out under the direction of Dr. H. F. Prytherch, in cooperation with the North Carolina Department of Conservation and the Federal Emergency Relief Administration.

Over 825,000 bushels of seed oysters at an average cost of approximately 8 cents per bushel have been planted, and 78,567 bushels of old oyster shells have been scattered over the bottoms to provide a place of attachment for subsequent generations of this shellfish. Inspection of the replanted beds in Pamlico Sound during September 1934 showed that a high percentage of the seed oysters have survived transplanting and culling operations and, because of their rapid growth under more favorable conditions, would provide good market stock in approximately 2 years. At the recommendation of the Bureau all replanted areas have been closed by a recent ruling of the State Fisheries Board for a period of 2 years in order to enable the transplanted oysters to reach market size.

INVESTIGATION OF OYSTERS AT NEW RIVER, N. C.

A general survey was made during March by Dr. H. F. Prytherch of the oyster beds in the New River region to determine the cause of the poor condition of oysters during the previous winter. The results of the Bureau's investigation, briefly summarized, are as follows: (1) The poor condition of New River oysters is attributed to exceptionally dry weather and decreased river discharge during the period from October 1933 to February 1934 when precipitation was 75 percent below normal; (2) closure of the inlet has not interfered with oyster growth and reproduction, as sufficient salt water now passes into this region through two larger inlets via the Inside Route Canal; and (3) deepening of New River Inlet is not advisable as it might easily increase the salinity of the water to such an extent that oyster beds now producing a high-grade product would be overcrowded with seed oysters and also subject to severe attacks by the boring sponge.

OYSTER INVESTIGATIONS IN FLORIDA

A complete survey of the principal oyster-producing areas in northwest Florida was conducted by Dr. H. F. Prytherch in cooperation with the State Department of Conservation and Federal Emergency Relief Administration for the purpose of restoring and developing this natural resource as a work-relief project. The most important beds were found to be in a depleted condition and in need of restocking with seed oysters and shells. Experimental planting operations of the type successfully carried out by the Bureau in this region last year clearly demonstrate the advisability of employing such methods on a large scale. Biological studies were made of the spawning and setting of oysters in these waters, which show that the planting of old shells should be carried out during the period from April 1 to September 15.

In Choctawhatchee Bay over 12,000 barrels of shell have been distributed over barren bottoms to create new beds and to increase the acreage of areas which are producing high-grade oysters. The general procedure is to plant 100 to 300 barrels of shell per acre, over which seed and adult oysters from the inshore reefs will be distributed in the spring to serve as spawners.

Destruction of oysters by parasitic flatworm.—A parasitic natural enemy of the oyster known as the " wafer " or so-called " leech " has become a serious menace to the continued natural production and private cultivation of this shellfish in Apalachicola Bay, Fla. Investigations conducted by Dr. Herbert F. Prytherch, in cooperation with the Florida Department of Conservation, show that this pest in the last 3 years has completely destroyed the seed and adult oysters on several of the best natural beds and is spreading rapidly to other valuable areas. The parasite is a turbellarian flatworm, *Stylochus inimicus*, measuring from one-half to three-fourths inch in diameter, which enters the shell of the oyster and feeds gradually upon the meat until it has killed its host. Since the fall of 1932 the parasite has destroyed the oysters on five natural beds comprising an area of 800 acres on which a crop estimated at 350,000 bushels, having an approximate value of $175,000, has been lost. Recently this natural enemy has spread to other beds at a distance of 12 miles from the original outbreak and to a nearby oyster reef, which is the largest in this region and contains nearly half of the entire crop. The Bureau's investigations show that the rapid growth, reproduction, and spread of the leech in Apalachicola Bay is associated with an unusually dry period, a considerable decrease in river discharge, and an increase in the salinity of the coastal water of this region. It is desirable that extensive dredging operations be undertaken to destroy the leech on its principal breeding areas and that scientific studies be made of this parasite, which has been recently found on oyster beds from North Carolina to Texas.

PROTOZOAN PARASITE OF VIRGINIA AND LOUISIANA OYSTERS

Oyster planters in Mobjack Bay, Va., and in Terrebonne Parish, La., suffered a loss of their stock amounting to over a million dollars during the winters of 1929–30 and 1932–33, respectively. Cytological studies of oysters from both regions conducted by Dr. H. F. Prytherch show that they were heavily infested with a parasitic protozoan, which tentatively has been identified as one of the Haplosporidia. This parasite was particularly abundant in the tissue of the adductor muscle, mantle, and gills, and was frequently found in the muscle of the heart. Representative samples of oysters from the mortality areas showed in every case a heavy concentration of this protozoan, the number ranging from approximately 50 thousand to 1 and 2 million per oyster.

In the immediate vicinity of the fisheries laboratory at Beaufort, N. C., it has been observed for several years that a large number of oysters die at an age of 1½ to 2 years, following a period of abnormal shell growth, similar to that observed in the oyster mortalities in Virginia and Louisiana. Recent cytological studies have shown that these oysters are also heavily infected with the same protozoan parasite. In all three localities the mortality was highest in oysters grown under crowded conditions in which large numbers of this minute parasite were found. From a practical standpoint it is apparent that oysters should be planted sparsely to prevent reinfection and spread of the parasite and also allow more favorable growing conditions for those which are heavily infected. Investigations are being continued at the Beaufort laboratory for the purpose of determining the life cycle, method of distribution, and proper identification of this micro-organism which appears to be a new natural enemy of the oyster of considerable economic importance.

OYSTER INVESTIGATIONS IN WASHINGTON

For a number of years the Olympia oyster industry has had difficulties due to unsatisfactory catches of seed oysters. Although the quality of the product has been normal the growers were unable, by use of the usual methods, to collect spat enough to fill the beds. For this reason an investigation of the spawning and setting habits of this species of oyster was undertaken by Dr. A. E. Hopkins. During four seasons accurate data have been collected on various phases of the problem, and the cumulative results are becoming constantly more significant. In addition, the rapid expansion of the Japanese, or "Pacific", oyster industry has involved numerous problems, such as propagation of this species in American waters, effect of environmental factors on fattening, and so forth.

Experimental studies have been carried on in typical oyster-growing areas of the most important bays near Olympia. Three times weekly during the breeding season 100 adult oysters (*Ostrea lurida*) were opened on each of the test beds, and the larvae from gravid specimens preserved for laboratory study. In this manner it was learned that larvae develop for about 10 days in the maternal brood chamber before being cast out into the open water. The data also show accurately the time and intensity of spawning in each locality throughout the season, as well as the total amount of spawning taking place. For example, in Oyster Bay in 1932 all of the oysters produced larvae once and 75 percent of them produced second broods. In 1933 only about 75 percent spawned as females, and in 1934 between 90 percent and 100 percent did so. These results indicate that there is wide variation between different seasons in the number of times spawning occurs, and consequently in the potential seed catch.

The time of beginning of spawning is clearly determined by temperature. During each season the first gravid specimens were found when the average daily water temperature reached 13° to 14° C. Records for the past 3 years show that the interval between spawning and setting varied between 39 and 51 days, of which the first 10 days represent development within the maternal brood chamber.

By careful analysis of the time and intensity of setting throughout the season it has been found that in certain bays periods of setting occur at intervals and are associated with the tidal cycles. This was found during previous years, and the 1934 results furnish further confirmation. Attempts have been made to determine in what manner the tidal cycle is effective, but the problem requires further experimentation. Although setting is heaviest during a run of extreme low tides, actual attachment of the larvae does not occur when the tide is low but appears to take place primarily at relatively high tide. Whether copper in the water is the effective agent for this species has not yet been determined.

Although at present it is impossible to predict with certainty when setting will begin, it is known that after the first larvae begin to attach there is still sufficient time for the growers to plant cultch before the most profuse setting takes place. By making constant observations and determining the exact date when setting begins one may be reasonably certain when the peak of the set will arrive, since this is so closely associated with the tidal cycle. By this method in 1933 and 1934 definite advice was given to oyster growers as to the time to plant cultch for best results. The seed catch of those who followed the advice has amply demonstrated the adequacy of the method.

Several years ago, on the basis of observations that larvae attach most abundantly to lower surfaces, a type of cement-coated cardboard spat collector—a modification of the egg-crate filler—was designed to furnish a large amount of horizontal surface. These collectors are now being used commercially in Puget Sound with very satisfactory results.

That the circulatory system of the oyster is more complicated than previously thought was shown by the discovery that an oyster possesses a pair of accessory hearts, or large, rhythmically pulsating blood vessels, within the mantle walls of the cloacal chamber. They appear to pump blood from the kidneys to the mantle and gills, where it is aerated. It is suggested that the organs are homologous to the branchial hearts of cephalopod mollusks. The accessory hearts are found in all three commercial species of oysters in the United States.

Further experiments were made on the adaptation of the Pacific oyster to changes in salinity. Adaptation of the feeding mechanism is relatively slow following a lowering of salinity, but rapid after a rise. Feeding ceases completely when salinity is reduced to 12–14 parts per thousand, and apparently adaptation does not occur, although growth of shell continues. It is probable that adaptation to salinities of 15–20 parts per thousand is never such as to permit the oyster to feed as rapidly as it does at 25–35 parts per thousand.

INVESTIGATIONS ON AQUICULTURE

Investigations in aquiculture were conducted in 1934 under the direction of Dr. H. S. Davis. These investigations, which were originally undertaken in connection with fish-cultural operations in the hatcheries, have been expanded to include field studies dealing with the various factors which affect fish in their natural environment. Opportunities for such field investigations have been greatly increased during the past year as a result of an allotment from the Public Works Administration for stream surveys and stream improvement in the national forests and parks.

The experimental hatcheries at Leetown, W. Va., and Pittsford, Vt., are strategically located for conducting investigations in the waters of the national forests. The Leetown station is within a short driving distance of both the George Washington and Monongahela National Forests, while the Pittsford station is situated within the boundaries of the recently enlarged Green Mountain National Forest.

Thus, both stations afford exceptionally favorable opportunities for conducting field studies and experiments in cooperation with the United States Forest Service.

POND-FISH CULTURE

Investigations in pond-fish culture during 1934 were limited to those conducted by O. Lloyd Meehean at the Natchitoches (La.) station. These investigations are designed primarily to throw light on problems which have arisen in connection with pond culture in the Southern States where conditions in many respects are quite different from those found at hatcheries in the North.

The investigations at the Natchitoches station were concerned chiefly with the use of fertilizers in pond culture. Since experiments in previous years have shown conclusively that proper fertilization of rearing ponds results in a marked increase in the production of fish, the experiments during 1934 were designed primarily to furnish a comparison of the value of different fertilizers for this purpose. The results, however, are inconclusive, since no correlations were found between any of the ecological groups of food organisms and the amount of the different elements composing the fertilizers. It is concluded that this was due to the fact that more fertilizer was used than was necessary. Consequently, there was at all times a surplus of food material available. Under such circumstances it is logical to assume that the production would be limited by other factors than food.

The results agree with those obtained in 1933 in failing to show that there is necessarily any correlation between the production of plankton in a pond and the production of fish as claimed by some authors. There is, however, a distinct correlation between the number of Chironomidal larvae per unit area of bottom sample and the production of fish. This indicates that fish production is dependent on bottom organisms rather than on plankton.

The experiments indicate that the number of fish produced per acre is not a good index of production in a pond after bass have reached a length of about 2½ inches. The greater forage area needed by the larger fish and the change in food habits necessarily reduces the number of individuals. Consequently, with larger fish the weight of the fish rather than numbers should be taken as a criterion of production. This is especially important in the South owing to the early spawning season, the young bass usually reaching a length of 2½ inches by the 1st of June. Bass can be reared successfully to this size without the use of forage minnows, but if they are to be kept in rearing ponds through the summer the need of forage fish is clearly indicated.

As a result of these experiments, Mr. Meehean believes that in the Gulf States at least it may be necessary to choose between heavily fertilized ponds which will carry a large number of bass to 2 or 2½ inches and ponds producing an adequate supply of forage food for a longer growing season. In the heavily fertilized ponds the number of fish may run very high if the ponds are drained and the fish removed by the 1st of June. These ponds could be utilized during the remainder of the season for sunfish and catfish or other species that require a longer growing season and spawn later. The other alternative will be to supply a large amount of forage food to carry the bass through the summer until October or November, in which case there will be a smaller number of large bass.

An allotment from the Public Works Administration has made possible the construction of a number of bass ponds at the Leetown (W. Va.) experimental station, but these ponds were not completed in time to be used during the season of 1934.

TROUT CULTURE

Feeding experiments.—Owing to lack of sufficient funds the feeding experiments which have been carried on at the Pittsford and Leetown stations for several years were discontinued. However, at the Leetown station some preliminary studies were made on the growth of yearling and 2-year-old trout. These fish were fed a diet composed of 60 percent sheep liver, 20 percent salmon egg meal, and 20 percent meat meal. Each experimental lot consisting of 325 fish was held in a circular pool 22 feet in diameter. It was found that the rate of growth of both yearling brook and rainbow trout as well as that of 2-year-old rainbow and brown trout was considerably smaller than in the case of fingerlings. In feeding fingerlings the amount of food consumed increases steadily throughout the summer; but with the older fish on the diet used, the amount consumed remained unchanged in some instances for 2 months or more, the fish continuing to grow nevertheless.

It was found that both yearling brook and rainbow trout consumed a greater amount of food per day in proportion to their body weight than the 2-year-old fish. The experiment also showed that rainbow and brown trout could eat more of the diet fed without ill effects than the brook trout. In other words, the brook trout, when given an opportunity to eat all they could, suffered injurious effects as indicated by high mortality and loss of appetite. This indicates that brook trout are more easily overfed than brown or rainbow trout.

The nutrition studies have been continued at the Cortland, N. Y., hatchery by Dr. C. M. McCay and A. V. Tunison. Two lines of research were conducted during the past year: (1) Studies of the interrelationship between various foodstuffs, rate of growth, and mortality were continued; and (2) chemical-balance studies with trout have been initiated. The chemical-balance studies depend upon accurate chemical analyses of both the food ingested and the excreta.

The experiment to determine the relative ability of lake trout (*Cristivomer namaycush*), brown trout (*Salmo fario*), rainbow trout (*Salmo irideus*), and brook trout (*Salvelinus fontinalis*) to convert foodstuffs into body tissue were carried through the ninety-second week. All four species were maintained under similar conditions and fed the same diet, which consisted of 2 parts fresh beef liver and 1 part dry skim milk. The number of individuals was reduced from time to time so as to prevent overcrowding. The uniformity of the growth rates of the four species is surprizing. Over long periods of time the growth tends to be strictly logarithmic. However, the rate changed to a lower one after the thirty-second week. Under the conditions of the experiment the lake trout were the most efficient in converting food into body tissue, while the brown trout were the least efficient. It is evident that older fish are more efficient in the conversion of their food. The rate of growth and the maintenance requirements partly tend to counterbalance each other in the efficiency of food conversion.

Experimental feeding of trout fry has given some interesting results, from which the following conclusions can be drawn: (1) A mixture of 2 parts fresh beef liver and 1 part dry skim milk is a satisfactory diet for fry; (2) a higher percentage of milk tends to increase the mortality; (3) the mechanical method of feeding makes no difference in results when the fry are fed the same amount in percent of body weight; (4) different groups of fry yield uniform data for food conversion when the same diets are employed; (5) on a dry-food basis, the conversion of liver and milk is more efficient and economical than liver alone; (6) the most efficient conversion of food occurred in one of the groups of brook trout kept in warmer water; and (7) increasing the daily feedings from 4 to 6 gave a slightly better growth and conversion.

The large-scale experiments in the practical feeding of dry-feed mixtures of cottonseed meal, fish meal, dry skim milk, and salmon-egg meal supplemented with raw liver were continued. A different strain of fish was used in 1934 as well as several improvements in methods, but the results were practically the same as those obtained in 1933.

An attempt was made to produce the same brilliant coloration found in wild trout. Dried salmon eggs were extracted with 95 percent alcohol and the colored extract fed to brook trout. The fish fed the extract developed marked color at about the eighth week, while those fed the residue developed little, if any, color. Salmon oil produced a similar coloration when mixed with the dry food at a 10 percent level. However, in no case did the colors produced approach those of wild fish. The fat soluble histological pigments Sudan (III and IV) failed to produce color in the trout except that when fed at the 0.5 percent level the intestines and mesentery fat showed some pigment.

Some further work has been done on the feeding of preserved fresh meat. Liver preserved in both 1 and 2 percent formalin and in chlorinated lime was sealed in glass jars and kept at 10° C. for 2 years. This preserved liver was then used at a 25 percent level, to supplement a mixture of skim milk, fish meal, and cottonseed meal. After 14 weeks the trout had doubled their weight with no signs of being poisoned by the preserved meat.

The chemical balance studies have concerned themselves with the determination of the digestibility of fats. Two objectives were in mind: (1) to determine whether oils such as cottonseed and salmon were digested better by trout than a hard fat such as hydrogenated cottonseed oil (Crisco), and (2) to measure the relative digestibility of these fats by trout of two different ages and sizes. It was found that the oils were digested better than the solid fat, and that there was no real difference between the digestion and utilization of cottonseed oil and salmon oil. The melting point of the oil or fat is the essential characteristic rather than its origin. The trout seemed to utilize about the same percent of the fats when the level in the diet was 7 and 25 percent. Fats were digested to about the same extent by trout weighing 2 grams and those weighing 100 grams.

Selective breeding.—Experiments in selective breeding of brook trout were conducted at the Pittsford (Vt.) station under the direction of R. F. Lord. At the beginning of the year, 43 lots of fingerling trout were being held in small compartments in hatchery troughs. Each lot was composed of the progeny of a single pair of selected fish. The parent fish were in their third year and averaged 12.9 inches in length with an average weight of 16.6 ounces in the case of the females, while the average weight of the males was 18.2 ounces and the length 13.6 inches. Such differences in the sizes of male and female brook trout of the same age are quite typical.

The young fish were kept under strict observation, and late in the spring those lots which did not reach the desired standard were discarded. The remaining lots were reduced to 400 fish each, which were kept segregated during the summer. The surplus fish from these lots were retained for general brood stock.

At the close of the season the various lots were carefully compared and only the very best lots with regard to growth, resistance to disease, and hereditary background were retained.

As indicated in previous reports, the results of these experiments in selective breeding have been very gratifying. There has been a remarkable increase in the egg production and rate of growth of selected fish and also an improvement in resistance to disease. Similar experiments with rainbow and brown trout are being carried on at the Leetown station, but there has not yet been time for these experiments to show material results.

Experiments in rearing exotic species.—The Pittsford brood stock of Montana grayling was stripped for the third time in the spring of 1934. A good hatch was obtained from these eggs, and about 6,000 fingerlings were retained for wintering. It is planned to use these fish to stock a pond which has recently been built in the Green Mountain National Forest. A stock of grayling derived from eggs shipped from Pittsford is also being reared at the Leetown station. These fish have done very well, and it is expected they will produce eggs in the spring of 1936.

Excellent results were obtained from a small lot of golden trout (*Salvelinus aureolus*) eggs from Lake Sunapee, N. H., which were shipped to Pittsford in the fall of 1933. The fingerlings were carried through the summer with very little loss and by fall many of them had reached a length of 6 inches or more. A tendency of the fish to crowd together at one end of the trough was overcome by excluding the light.

A stock of California golden trout (*Salmo aqua-bonita*) is also being reared at the Pittsford station. These fish are quite susceptible to furunculosis, and considerable losses have occurred from this disease; but in other respects they appear to be no more difficult to rear than other species of trout.

Field studies.—An investigation of the results of planting a certain number of rainbow trout fingerlings in a 1-mile section of a spring-fed stream near Leesburg, Va., was continued by E. W. Surber, in charge of the Leetown station. In addition to collecting data on the ages, condition factors, and food of legal size rainbow trout removed from the stream, quantitative studies were made of the natural food present. For this purpose bottom samples were taken in the gravel riffles at 10 to 16 stations along the stream at monthly intervals.

During the season of 1934, a total of 94 legal-size fish were taken from the stream with hook and line. This is a production of 27.66 pounds of trout per acre. These results agree very closely with those obtained in 1933, when a production of approximately 30 pounds per acre was recorded. Measurements of the fish showed that they had made a very good growth and were in excellent condition.

Food studies again demonstrated the great dependence of rainbow trout on terrestrial insects during the summer periods, but these studies also showed greater dependence on aquatic forms than in the previous season. A total of 196 bottom samples on gravel riffles showed an average wet weight of 5.047 grams per square foot and 0.982 gram dry weight per square foot for the year. This amounted to an average standing crop of 485.8 pounds (wet weight) per acre in the gravel riffles of the stream. A study of the variability of sampling showed that the samples varied less than one-third from place to place in the numbers of gammarus and fasciatus (the predominant organisms) in individual samples during May, June, and July.

An attempt to obtain statistics on the number of trout caught during the season of 1934 in several streams in Vermont through cooperation with the anglers was far from successful. Mail boxes painted a brilliant red to attract attention were placed along the streams at locations where anglers usually left their cars. A conspicuous sign attached to each mail box called attention to the fact that the Bureau of Fisheries was attempting to secure figures on the number of fish taken annually from the stream in question as a guide to future stocking. The anglers were urged to cooperate by giving the desired information on cards provided for the purpose, which were to be deposited in the mail boxes. The boxes were all in position when the fishing season opened on May 1, 1934.

In spite of efforts to secure the cooperation of anglers with the least possible trouble on their part, the results were very disappointing. Only a small percentage of those fishing in the streams filled out reports during the first day or two of the season, and as the season progressed the number of cards deposited in the boxes steadily decreased until toward the end of the season almost no reports were received.

The best returns were received from the anglers on Furnace Brook, although it was evident that only a small percentage of those fishing the stream filed the reports. The data revealed that during the months of May and June fishing conditions were quite uniform, with an average catch of 7.4 trout per fishing attempt. In July fewer anglers reported that the average catch was 13 trout. This is not taken to mean that fishing conditions had improved but that only the more successful anglers reported.

Similar returns were obtained on the South Branch of Cold River, a small mountain stream with an average volume of about 12 to 15 cubic feet per second. This stream was stocked with 700 marked yearling rainbow in September 1933. Only 24 reports were received from anglers for the month of May, and these reported 82 rainbows of the 1933 planting. Three reports were received later, which brought the total number of rainbows caught during the season to 87 fish. This is a return of approximately 12 percent. Since it was evident that only a small percentage of the anglers reported their catch, it is believed that the returns from this planting were quite satisfactory. One rainbow was reported which had been planted in 1932. These experiments are being repeated during the present season.

In cooperation with the Middlebury College an attempt was made to obtain similar data on waters stocked and controlled by the college. Special permits required of those fishing in streams on college property were issued with the understanding that each angler would report his daily catch in a space reserved for this purpose on the permit. Even under these circumstances it was found very difficult to get returns, and the reports received were too meager to throw much light on trout-stream production. They do show, however, that the average daily catch of legal-size fish was 9.4 per trip in 1933 and 7.4 per trip in 1934. The reports also show that the number of short trout taken and returned to the stream greatly exceed the number of those which had reached legal size.

California trout investigations.—Work has progressed rapidly on most of the projects initiated in 1932 when these investigations were started. Subsequent experience necessitated several modifications of the original program and the work now consists of two major projects, the Hot Creek brood stock experiment and the coastal stream steelhead studies. The former project is under the direction of Dr. P. R. Needham, who is also in charge of the field program as a whole. The latter project is under the supervision of A. C. Taft. Work on several minor projects is being carried on as time permits. Three assistants are supplied to the work by the California Division of Fish and Game.

The Hot Creek experimental project was greatly expanded this year with the construction of a series of 12 concrete raceways, 20 feet long by 4 feet wide. Two new ponds to hold brood stock were also constructed as well as a combination garage, meat house, and laboratory. Late in the fall a small experimental hatchery was completed with C. C. C. labor. Over $3,000 was expended on these improvements. Over 67,000 small trout, consisting of 6 separate strains of rainbows and 1 lot of eastern brook trout, were placed in the ponds after construction work was completed. These fish are to form nuclei for rearing select domestic brood stocks for experimental purposes. An additional source of rainbow eggs is needed in California, and breeding experiments for high egg yields, rapid growth, coloration, and other genetically desirable characteristics, therefore, will be carried on largely with this species. One distinct advantage offered at the Hot Creek area is the tremendous natural production of shrimp, making it unnecessary to feed artificial food to many of the younger fish, thus reducing costs materially. Over a quarter of a pound of pure shrimp were taken from an area of 1 square foot in the watercress in one of the ponds. A fine series of springs supply about 30 second-feet of water at temperatures varying from 57° F. to 68° F. which permit rapid growth over most of the year.

Data from the coastal stream steelhead studies started in 1931 at Scott and Waddell Creeks and on the Klamath River are rapidly being augmented. The counting weir constructed on Waddell Creek in 1933 has been operated continuously since this time.

During the winter season of 1933-34 at Waddell Creek, the spawning migration consisted of 478 steelhead and 538 silver salmon of which 263 and 213 were females, respectively. The silver salmon migration was largely confined to the last 2 weeks of December, while the steelhead came in over a longer period which extended from January to the end of March. There was a considerable loss among the steelhead due to disease, which was probably furunculosis and which was associated with very low and warm water during March, April, and May. Most of these fish died after spawning. In addition to the adults moving upstream, 128 young fish varying in length from 90 to 295 centimeters were taken in the upstream trap during the months of December and January. These were undoubtedly fish which had spent the summer in the closed lagoon, and some of the larger were sexually mature males. They were given a distinctive mark and passed on upstream. Later, 70 of these fish were taken on their downstream migration with the other young steelhead.

There were small numbers of downstream migrating steelhead during December, January, and February, but the movement was greatest during March and April, and from length frequencies it appears that fish that had just completed their second year predominated. A total of 3,117 young steelhead were trapped and 2,452 of them marked by the removal of the adipose and right pectoral fins. During June, July, and August, a few fish of the year were taken in the trap each week.

The downstream migration of young silver salmon (*O. kisutch*) was much more concentrated than that of the young steelhead; that is, there was no scattering of fish previous and subsequent to the main movement. The migration was also later, coming in April and May. A total of 3,430 young salmon were taken, and 3,211 of them were marked by the removal of the adipose and right pectoral fins.

An interesting discovery was the fact that the two species of cottoids inhabiting the stream (*Cottus asper* and *C. gulosus*), apparently migrate downstream to spawn. During the period December to May, 3,357 of these fish were taken in the downstream trap and both males and females were approaching spawning condition as evidenced by the gonads. Although efforts were made to determine just where they spawned, neither eggs nor fry were found. These cottoids are very destructive to young trout and salmon and this annual period of migration may offer an opportunity to reduce their numbers in such streams as it is felt desirable to do so.

Work has been continued at Scott Creek on certain phases of the artificial propagation of steelhead and, in conjunction with Waddell Creek, on the homing instinct in these fish. The mouths of these two streams are separated by only 5 miles of coastline and the annual release of marked fish in each stream should make it possible to determine the degree of straying. It is becoming increasingly difficult to secure a supply of steelhead eggs for the hatcheries without encroaching on streams which are also heavily fished. An attempt is being made at Scott Creek to build up this stream for egg taking and although water conditions have been so unfavorable during the past few years that parts of the stream have dried up completely, the run is being slowly increased through holding fish in ponds and planting them during the winter months. During the past year 10,054 of the fish planted were marked by the removal of both ventral fins. During the winter season 455 adult fish were taken in the trap and before release were tagged with celluloid disks and nickel wire. The tags were placed in the anterior base of the dorsal fin. Of the fish tagged the previous year approximately 7 percent returned this year as compared with a return of 13 percent from the previous year's tagging. The returns are quite obviously dependent on the age of the fish tagged as very few fish return to spawn the third time.

On the Klamath River 45,700 yearling trout were marked and planted during May. Part of these fish were from eggs taken in the Klamath River while 9,770 were from a possibly nonmigratory type of rainbow taken in Kosk Creek, a tributary of the Pit River. At Beaver Creek on the Klamath, arrangements have been made to install a trap at the egg-taking station to take downstream migrants. This will make it possible to correlate information obtained at Waddell Creek with that of the streams tributary to the Klamath.

Work was also continued on two minor projects, the Angora Lake and Truckee River marking experiments.

The Angora Lake project was started in 1933 with a plant of over 5,000 marked eastern brook trout. The objects of this experiment are to determine: (1) Total annual production in pounds of fish per acre of water as shown by anglers' catches; (2) survival rates from plants of various lots of marked trout of given sizes; and (3) the correlation between the actual production in fish and food conditions in the lake. The lake offers exceptional opportunities for obtaining complete returns from anglers, and the resort owner on the lake is receiving a small annual stipend to record and weigh all fish caught.

Returns for the fishing season of 1934 show that anglers took only 81 trout, having a total weight of 71.2 pounds. Since Angora Lake is, roughly, of about 5 acres area, these figures show that production in terms of fish landed by anglers was approximately 14 pounds per acre of water surface. The average catch per angler was 2.3 fish. Of species, 25 loch leven, 14 rainbow and 42 eastern brook trout were taken. The figures are based upon partially complete returns. None of the marked eastern brook trout planted in the previous summer entered the catches this year, due doubtless to the fact that their average size at planting was slightly under 2 inches.

Excellent returns have likewise been obtained from the Truckee River marking experiment which was started in 1932 with the planting of 40,000 trout. In 1933 an additional 40,000 were planted, and they entered into the catch in considerable numbers during the past summer. In one lot of 62 fish taken by anglers, 49 were fish of this marking.

Field studies of stream food problems were continued in Waddell Creek in the spring, though lack of time and the pressure of other matters prevented detailed work of the type carried on the year previously. Bottom food samples were taken to determine the bulk or weight of food which each group contributes to the total potential supply in this stream. It was found that caddisfly larvae and pupae, which formed only 22.2 percent of the total number of organisms taken in one series of 13 samples, formed 43.9 percent of the total wet weight of all organisms, offering the most food by bulk of any group of aquatics. Mayfly nymphs, on the other hand, were most abundant, forming over 55 percent by number but only 28 percent by weight. Stonefly nymphs were third in weight of food at 12.2 percent and fourth in numbers at 7.8 percent. Aquatic truefly larvae and pupae (Diptera) formed 10.3 percent by number and only 7.9 percent by weight of total available foods.

Some work was started on the distribution and abundance of stream foods in relation to water temperatures and other ecological factors, but much further field and laboratory work will be necessary before results can be submitted on these phases of the problem.

FISH DISEASES

Investigations were conducted by Dr. Frederic F. Fish on the "ulcer disease" of trout which he has shown to differ in many respects from furunculosis with which it was formerly confused. The disease is characterized by definite thickening of the epithelium over a small area, producing an inconspicuous white patch which in general appearance closely resembles a small growth of fungus (sapolignia). This condition is best described as an "epithelial tuft." Eventually the skin becomes perforated and the small ulcer is formed. When a lesion of the "ulcer disease" develops on a fin, the soft tissue between the fin rays is destroyed leaving the rays projecting beyond the neucrotic tissue. As the disease progresses the neucrotic area advances in a more or less horizontal line toward the base of the fin. In advanced stages of the disease the fin may be entirely destroyed while the infection penetrates deep into the underlying tissue. There is no evidence, however, that the infection ever reaches the internal organs.

The causative agent of the disease is evidently a bacterium. Several species of bacteria have been isolated from diseased fish, but it has not yet been possible to demonstrate conclusively that any one of them is the specific etiological agent.

During the early part of the year Dr. Fish was stationed at the Leetown (W. Va.) station to investigate an epidemic of blue sac which was causing heavy losses among the brook and brown trout fry. In contrast with other investigators, Dr. Fish was unable to find any definite evidence that the disease was due to a specific infection. Cultures of the serus fluid gave negative results except in a few instances. Sections of the diseased tissue also failed to disclose any evidence of bacterial activity and there was nothing to indicate that the disease spread from one trough to another as is usually the case with bacterial infections.

During the summer Dr. Fish was detailed to cooperate with the Oregon State Game Commission in a study of fish-cultural problems which had arisen in connection with the operation of the State trout hatcheries. Field headquarters were located at the Oregon State College, Corvallis, and inspection trips were made to all but two minor State trout hatcheries and to many points where the Oregon Game Commission had been carrying on field work. The purpose of these trips was to review the entire system of trout propagation and management in the State. Special attention was paid to the prevalence and control of disease among hatchery fish. At the end of the season a report was prepared on the operation of the individual trout hatcheries based on actual observations and on a questionnaire sent to all hatchery superintendents.

In order to facilitate the study of diseases which are becoming a serious problem in many trout and salmon hatcheries in the West it was decided to install a pathological laboratory at the Fisheries biological station in Seattle with Dr. Fish in charge. The need for such a laboratory is very evident since there are reasons for believing that in addition to most of the diseases which affect trout at Eastern hatcheries there are other diseases which are peculiar to this region or at least have not yet been found at Eastern hatcheries.

Experiments have been conducted looking toward the improvement of methods of treating fish in pools by allowing a very dilute chemical solution to flow into the pool at a uniform rate. Solutions of potassium permanganate, copper sulphate, and chlorine have been recommended for this purpose, but in no instance have the methods yet devised proved entirely satisfactory. It has been found extremely difficult in practice to treat fish in pools with such solutions without serious danger of killing large numbers of fish. In some instances very satisfactory results have been obtained, but in other cases heavy losses have occurred when using the same treatment. It is believed, however, that these difficulties can be eliminated largely by further experiment in the technique of treatment.

An experiment to test the value of iodine as a cure for furunculosis was carried out at the Pittsford station. For this purpose a lot of yearling California golden trout, which are quite susceptible to the disease, was divided into two equal lots and placed in small circular pools. Before beginning the experiment these fish had been showing a small daily mortality from furunculosis for some time. One lot was used as a control, the other lot was placed on a diet containing salmon oil and a solution of iodine according to the recommendations of E. R. Hewitt. The experiment was started August 10 and for the first 13 days the losses in both lots were approximately the same. The total losses on August 23 were 46 in the lot given iodine and salmon oil, and 47 in the controls. The supply of salmon oil was exhausted on that date and the iodine solution soon after, but the experimental lot was kept on a dry diet supplied by Mr. Hewitt for a month longer. During this period the loss among this lot was appreciably less than among the controls. The experiment was discontinued on September 22 at which time the losses among the lot on the Hewitt diet totaled 74 and among the controls 144.

While these results show approximately twice the mortality among the controls as among the fish kept on the Hewitt diet, it is by no means demonstrated that this difference was due to the inclusion of iodine or salmon oil in the food. As a matter of fact, the supply of both of these constituents was exhausted at about the time the fish began to show improvement, and the decreased mortality among the experimental lot may easily have been due to other causes. In previous experiments marked differences in mortality from furunculosis have been observed frequently among fish on different diets. Whatever the explanation, these experiments evidently lend little support to the view that iodine is a specific cure for furunculosis.

STREAM SURVEY AND STREAM IMPROVEMENT

During the summer of 1934 the Bureau inaugurated an extensive series of stream survey and improvement work in the national forests and parks in cooperation with the United States Forest Service and the United States Park Service. This work was made possible by an allotment of $127,500 from the Public Works Administration.

Stream surveys.—The stream surveys were conducted by 16 parties operating in forests and parks in various parts of the country. In most cases each party was composed of a biologist in charge, three assistant biologists, and a camp attendant. The equipment of each party consisted of a complete camping outfit, a 2½-ton pick-up truck, and the necessary apparatus for collecting physical, chemical, and geological data on lakes and streams. Because of climatic conditions, the time spent in the field varied greatly in different sections. One of the survey parties in the South, for instance, was in the field for over 8 months while those working at high altitudes in the West were in the field for only 3 months.

The primary purpose of the surveys is to provide an inventory of conditions in each lake and stream which affect the fish population. With this information at hand it will be possible to determine what species of fish is best adapted to each body of water and the number it can support most advantageously. This knowledge is essential for the development of a rational and systematic stocking policy which will make possible the most efficient utilization of forest waters. In the absence of such basic information, fish are frequently planted in waters to which they are not adapted, and in numbers which have no relation to the productive capacity of the stream.

In the East four parties surveyed completely or in part the Great Smoky Mountains National Park in North Carolina and Tennessee, and the following national forests: White Mountain and Green Mountain in New England, George Washington and Monongahela in Virginia and West Virginia, and Pisgah and Nantahala in North Carolina, South Carolina, and Georgia. The 12 parties operating in the Rocky Mountain region covered completely or in part the Glacier National Park and the following national forests: Wyoming, Challis, Sawtooth, Cache, Wasatch, Rapaho, Humboldt, Santa Fe, Carson, Coconino, Apache, Tonto, Crook, Mono, Inyo, Sequoia, Shasta, and Klamath.

A report including the important data collected by the survey parties and recommendations for stocking has been prepared for each forest. These reports give brief accounts of the physiography of the region followed by a description of the principal streams and lakes of each watershed, including the physical and chemical characteristics and accessibility. This is followed by a discussion of the biological characteristics of each body of water, including the fishes and other vertebrates, the kinds and relative abundance of food organisms, and the presence of aquatic plants. A summary of the essential data required for developing a stocking program for each body of water is given in tabulated form, accompanied by stocking recommendations.

STREAM IMPROVEMENT IN CONNECTION WITH THE STREAM SURVEYS

Extensive work in stream improvement was carried on in the national forests in cooperation with the Forest Service. Except in a few instances, the work was done by C. C. C. labor under the supervision of men employed by the Bureau. Since there are few reliable data on which to base an estimate of the true value of stream improvement the work was primarily experimental.

It is evident that the nature of improvements which will prove of most value will vary widely with conditions and for that reason stream conditioning was carried on in as many different types of streams as possible. Very little work has been done heretofore on swift, mountain streams such as are found in the great majority of the national forests. Such streams are obviously more difficult to work with than sluggish, meadow streams which have been the type on which most improvement work has been done in the past. In some instances streams were selected for improvement that offered most serious obstacles to permanent installations for the purpose of subjecting the devices to the most rigorous tests. Preliminary reports indicate that most of these installations have withstood the effects of exceptionally heavy floods with little damage.

At the conclusion of the summer's work a memorandum was prepared on " Methods for the Improvements of Streams." This memorandum contains a discussion of the principles of stream improvement and detailed descriptions of the devices which have been found to be of greatest value.

INVESTIGATIONS IN THE ROCKY MOUNTAIN REGIONS IN THE INTEREST OF FISH STOCKING

The Bureau's investigations in this region by Dr. A. S. Hazzard are almost solely directed toward the betterment of sport fishing. Commercial fishing at present is restricted to the taking of whitefish in certain States and to limited sucker and carp fisheries in others. Angling (principally for trout) is becoming increasingly popular with the resident and tourist, while in the majority of areas the fishing is rapidly deteriorating. The rapid development of new roads and trails and the accompanying increase in angling have necessitated extensive stocking and environmental improvement.

Investigations during the past 4 years have demonstrated the need for intensive studies of the life histories of the principal native game and forage fish in order to determine their requirements. Such studies should indicate the types of waters to which they are best suited and how their environment can be improved. Similar studies of so-called " obnoxious " fishes such as the chub, bony-tail squawfish, and sculpin are also necessary in order to learn the extent of their competition with game fishes or their unsuspected value to these fishes. This information is necessary before intelligent efforts toward control can be made, if such control proves desirable.

Prior to 1934, the following investigations were undertaken: Survey of Grand Teton National Park, Wasatch Forest studies, initiation of Glacier National Park survey of food production in mountain streams and lakes, life history studies of the cutthroat trout and Rocky Mountain whitefish, also miscellaneous investigations in cooperation with various State fish and game departments.

During 1934, investigations in this region were expanded as a result of funds allotted from the Public Works Administration. Nine survey parties were assigned to the Intermountain States to study waters of certain national parks and forests. The following results were obtained:

The survey of Glacier Park was completed, thus furnishing the basis for a management plan which will maintain fishing in this popular recreation area. Valuable contributions to our knowledge of mountain lakes and streams will also be made as a result of this study. Papers by specialists concerning the physical and chemical conditions, aquatic plants, plankton, and fishes are in preparation for publication.

The survey party assigned to Idaho studied certain waters in the Salmon, Sawtooth, and Challis Forests. As a result of these studies detailed plans for stocking and otherwise improving the lakes and streams of this popular area have been furnished. The apparent failure of previous plantings of smelt and eastern landlocked salmon was demonstrated by this investigation. Also a planting in 1931 of pond weed seed (*P. pectinatus*) in Pettit and Stanley Lakes was shown to have failed. Numerous gill-net sets in Redfish, Pettit, Alturas, and Stanley Lakes indicated a great abundance of suckers and squawfish but no trout, other than a few native Dolly Varden. It is apparent, therefore, that the heavy plantings of various species made have failed to benefit the lakes. Studies of the life history of the squawfish and suckers should be made in order to effect their control.

In Utah a survey of the Cache Forest and certain waters of the Wasatch and Ashley Forests revealed the need for stream improvement and indicated that more intelligent planting would produce better fishing. Detailed plans for this work have been prepared based on data collected.

The survey party also cooperated with the Bureau of Animal Industry and the State fish and game department in determining the effects of the proposed copper-sulphate treatment in trout streams. A concentration of 1:500,000 was used for 24 hours in East Canyon Creek. The results indicated that wherever the concentration was strong enough to kill the objectionable snails it was deadly to trout, though not harmful to the other fish food.

In cooperation with the United States Forest Service, experiments in the fertilization of small, high mountain lakes were initiated. Since soil and water analyses of these lakes and a highly productive trout lake (Fish Lake) demonstrated a deficiency in carbonates, phosphates, and nitrates in the former, known quantities of these substances were introduced to determine the practicability of fertilization. Aquatic plants and fish food organisms from Fish Lake were also introduced. Detailed quantitative studies of chemistry and food supply made prior to these alterations will be repeated later to determine the results.

The survey party in Nevada studied the streams and lakes in a portion of Humboldt Forest. Although difficult of access, these waters are becoming more heavily fished each year and stocking plans for them are in great demand. The superiority of eastern brook and cutthroat trout over the rainbow for these high waters was clearly proved by results of the survey. The need for pool improvement was also demonstrated.

In Arizona the survey party examined the waters of the Coconino, Tonto, Crook, Coranodo, Apache, and Tusan Forests, and a portion of the San Carlos Indian Reservation. The enormous area covered was due to the scarcity of water in this region and the numerous roads. However, this very scarcity enhances the value of the public fishing water and is resulting in strenuous efforts of the fish and game commission and Forest Service to maintain the angling. The need for more systematic stocking, better regulation, stream-improvement work, and erosion control was demonstrated by the survey.

Portions of the Santa Fe and Carson Forests were studied by the New Mexico party. These areas are used extensively for recreation and the fishing has been declining in spite of the excellent work of the fish and game commission. The survey's results indicated a need for stricter regulation of fishing or more frequent planting of legal-sized fish. Recommendations for additional stream and lake improvement were also made.

The Colorado survey party worked in close cooperation with the Forest Service in carrying out the program for improvement of fishing in the Arapaho, Roosevelt, Pike, and San Isabel Forests. Recommendations for stream improvement and rearing pond construction were acted upon immediately during the past season. Detailed plans are being prepared which should assist in the stocking of these waters.

The Wyoming survey party studied a portion of the Wyoming Forest. The lower waters in this area, which are accessible by road, are heavily fished. It is the desire of the fish and game commission and the Forest Service to stock the higher waters according to their requirements in order to induce the anglers to fish there, thereby relieving the strain on the lower waters. Because of transportation difficulties only a limited number of waters could be studied this season. However, sufficient information was secured to enable some generalizations covering the species best adapted, and the intensity of planting which should be carried on in this region.

COOPERATION WITH THE FOREST SERVICE IN STREAM AND LAKE IMPROVEMENT

The West Fork of Rock Creek in the Deer Lodge Forest in Montana was selected as an experimental stream-improvement project. Careful counts of the fish and fish-food population were made in a section of this stream. Sixty-eight structures of various types were then installed. An accurate, large-scale map showing bottom types, location of counts, plant beds, and structure location was made. Careful studies in the future will be carried out to determine the benefit of the improvement work in this stream.

In each of the other seven States of this region the Bureau detailed an investigator to assist the Forest Service in stream-improvement work. It was his duty to prepare plans for the streams designated by the Forest Service and to furnish technical supervision. These men worked in 30 national forests in the region and planned 5,604 improvements, of which approximately half were completed this season. This work was recommended for 153.8 miles of stream, or approximately 36 structures per mile. The major part of the construction was accomplished by the C. C. C., although some was financed out of other Forest Service funds.

In order to determine the effectiveness of various devices in different types of streams, each structure was tagged and notes were taken concerning conditions before and after installation. A check of the work following the spring run-off should indicate the most successful structures for the streams of this region.

In addition to stream improvement, a limited amount of lake alteration was planned by these workers. Raising the outlet to increase the area and installing brush covers to furnish shelter for fish were carried out as experiments in a few selected lakes.

COOPERATION WITH THE UNIVERSITY OF UTAH

A number of advanced students registered for special work under the Bureau's direction have been pursuing certain basic fishery investigations. Life-history studies of several species of fish are in progress. A comparative study of some Utah trout streams and studies of the rate of food recovery in streams affected by floods are also being made. The collection of fishes which is being built up at the University Museum will be of great value both for the instruction of students and for future studies in this region by the Bureau or other investigators.

The impetus given to the study of fishes and their environment should aid greatly in the solution of the many problems confronting the agencies concerned with maintaining the sport fishing in this region.

INVESTIGATIONS IS INTERIOR WATERS

The extensive activities of the unit under the direction of Dr. M. M. Ellis have been made possible not only by the cooperative work of the various members of the staff, but also because of the cooperation of the Corps of Engineers of the United States Army, the Tennessee Valley Authority, and Division of Fish Culture of the United States Bureau of Fisheries. Active work was maintained throughout the year at the Columbia (Mo.) laboratories and at the substation, Fort Worth, Tex., and for considerable portion of the year on the floating laboratory, U. S. Quarterboat *348* and at the Neosho (Mo.) hatchery.

During the past 12 months the activities have followed three major lines.

POLLUTION STUDIES (F. P. 41 PROJECT)

During the course of the pollution studies streams and other bodies of water have been examined in 21 States, and a detailed survey of the

Mississippi River with reference to the effects of pollutant effluents on that stream has been made from Cairo, Ill., to Grand Rapids, Minn. The Mississippi River was chosen as presenting typical problems of a major stream receiving a variety of pollution effluents. Studies on other streams in different States have been made with reference to specific pollution problems as well. The effluents from some 15 types of industries representing over 80 industrial plants have been studied both in the field and in the laboratory. In addition, mine wastes, particularly from coal, lead, copper, iron, zinc, and arsenic mines, have been analyzed and assayed as pollutants. Oil pollution of fresh water has been given detailed attention in the States of Kansas, Oklahoma, Texas, and Louisiana, particularly during the months of October to January, inclusive; and these findings correlated with oil pollution already noted in our field work elsewhere.

Municipal effluents and garbage pollutants were given specific attention in the St. Louis, Davenport, and Minneapolis-St. Paul areas. During November a field party made an extensive study of the beet sugar industry effluents in Nebraska, Colorado, and Kansas, and other field parties have studied the sulphur pollution in Louisiana, limestone wastes in Indiana, natural alkali pollution in North Dakota and Montana. All of this pollution work has had as a major objective the determination of: (1) The effects of these substances on fish life, particularly the major types of fresh-water fishes; (2) the effects of these substances on fish food, specifically those insects, crustaceans, and mollusks, which constitute a large part of the food of fresh-water fishes; and on the aquatic bacterial flora, particularly those forms concerned with the utilization of organic wastes and those forms which are part of the food chain series in fresh waters; and (3) the chemical and physical balances of the various substances occurring naturally in many of the fresh-water streams of the United States.

From these studies standards of water purity have been determined for fish life and measurements of pollution hazards made which can be applied quite generally to the fresh-water streams of the United States. New and practical methods for measurement of pollution hazards, relative toxicity, and importance of pollution effluents have been perfected in the course of this work. The work completed shows definitely the size of the task involved and the needs for continuation of studies along these lines.

POWER DAM LAKES AND OTHER IMPOUNDED WATERS

Studies of power dam lakes and other impounded waters have been carried forward, particularly in connection with the Tennessee Valley Authority projects in the Norris Dam area and in connection with the Fort Peck Dam which is being constructed in Montana. As a result of these studies, recommendations have been made to the Tennessee Valley Authority, and certain special lateral lakes are now being established in the Norris Dam area to insure the maintenance of fish food and young fish supplies in these areas.

The Fort Peck area was given a general survey and preparations made for the continuation of this work this spring, when the construction will have proceeded further.

In conjunction with the Corps of Engineers, United States Army, survey work, analyses, and experimental tests were made back of several of the new dams which have been constructed as part of the Mississippi River channel project and recommendations made concerning the effect of these constructions on water conditions, fish food, and other fisheries interests in the impounded waters held by these dams.

MUSSEL PROPAGATION

The mussel propagation experiments which were started at Fort Worth 2 years ago have been continued throughout the past year, and detailed data collected concerning the growth, mortality, and resistance of fresh-water mussels which are being grown under controlled conditions in close quarters in the experimental raceways at the Forth Worth project. The results of these experiments continue to to be favorable to this method of artificial propagation, especially for certain species. As a corollary of the work at Fort Worth, a new shipping container has been devised, making it possible to ship live mussels long distances with very little loss.

INDEPENDENT ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

Lack of sufficient funds for the operation of the Woods Hole laboratory prevented the Bureau of Fisheries from providing the customary facilities for independent investigations at this laboratory.

Robert A. Nesbit, assisted by William C. Neville, ran parallel series of tests of methods of marking scup by insertion of tags into the coelomic cavity, in which it was found that the most successful method consisted of inserting flat celluloid strips $1\frac{1}{8}$ by $\frac{1}{4}$ inches. With this method 8 percent of the tags were lost during the first 3 weeks, and none was lost during the following 12 weeks of observation. By developing a marking technique in which losses are small and definitely ascertained, it becomes possible not only to trace the migrations of this species but also to determine what portion of the mortality is due to commercial fishing and what portion is due to natural causes, two items that are fundamental in formulating a conservative policy.

BEAUFORT LABORATORY

The Beaufort (N. C.) laboratory was severely damaged to the extent of over $10,000 by the tropical hurricane of September 16, 1933. It was possible, however, with funds provided by the Public Works Administration, to restore the buildings and equipment by the following spring and continue operations for the propagation of the diamondback terrapin, and investigations concerning oil pollution and serious natural enemies of oysters in the South Atlantic and Gulf region. With additional funds provided by the Public Works Administration, a bridge has been constructed to connect the laboratory with the mainland, which will increase the protection of the Bureau's property in case of fire and tropical storms and will enable the general public to inspect the station's exhibits of marine animals, fishing equipment, and methods developed for increasing the propagation of oysters and the diamondback terrapin.

Research.—Operation of the Beaufort laboratory was continued throughout the year under the direction of Dr. H. F. Prytherch and furnished facilities for the study of fishery problems of the South Atlantic and Gulf region. The chief investigations conducted here by the Bureau's staff, as reported in detail elsewhere, consist of (1) physiological effects of Louisiana crude petroleum and oil-well brines on the oyster; (2) studies of a protozoan parasite of the oyster associated with mortalities in Louisiana and Virginia; and (3) cytological studies of the ova and germ-cell cycle in two species of shrimp. The laboratory serves as headquarters for oyster investigations in the South Atlantic and Gulf States and, in cooperation with the conservation departments of North Carolina, South Carolina, and Florida, directs extensive operations for the rehabilitation of public oyster beds with funds provided by the Federal Emergency Relief Administration. Field investigations have also been made of the serious destruction of oysters in Apalachicola Bay, Fla., by a flatworm parasite, *Stylochus inimicus*, commonly known as the " wafer " or " leech."

Laboratory facilities for marine research have been furnished to 27 investigators from other institutions who were engaged in the following studies: Dr. H. V. Wilson, University of North Carolina, the biology of sponge cells, with particular reference to the fine cytoplasmic reticula formed in metamorphosing larvae and regenerative masses; Irene Bolick, University of North Carolina, dissociation and reunition of sponge cells of several local species; Dr. A. S. Pearse, Duke University, assisted by H. W. Hatsel and E. D. Huntley, ecological studies of estuarine animals; Dr. Bert Cunningham, Duke University, effect of temperature on embryonic development of the diamondback terrapin; Dr. Paul L. Risley, State University of Iowa, transplantation of reproductive organs and sex differentiation in the terrapin; Dr. George G. Scott, City College of New York, comparative histology of marine fishes; Dr. and Mrs. B. G. Chitwood, United States Department of Agriculture, identification and distribution of free living marine nematodes; Dr. W. C. George, University of North Carolina, studies of chordate blood and regeneration in the ascidian Styela; Dr. Hoyt S. Hopkins, New York University, respiration in marine mollusks in relation to oxygen tension; Dr. W. E. Bullington, Randolph Macon College, studies of marine ciliates; Dr. Lowell E. Noland, University of Wisconsin, morphology and taxonomy of ciliate protozoa, particularly those of the order Peritricha; L. Lyndon Williams, Rensselaer Polytechnic Institute, tissue regeneration in hydroids and related forms; Reinard Harkema, Duke University, parasites of rodents occurring on the coast of North Carolina; Dr. Hugh H. Darby, Bartol Research Foundation, regeneration of chelipeds in Alpheus and Uca; G. Robert Lunz, Jr., Charleston Museum, Stomatopoda of the Beaufort region; Dr. J. Paul Visscher, Western Reserve University, rare species of barnacles.

In cooperation with the Federal Emergency Relief Administration, laboratory facilities were provided for the employment of eight college-trained women on a research project covering studies of the complete life cycle of the black skimmer, *Rhynchops nigra.* The project was carried out under the supervision of Dr. Alice L. Brown, with the assistance of M. Waynick, A. L. Bason, A. S. Sherrill, B. Arnold, and L. Jarrett, of the North Carolina College for Women; I. Bolick, University of North Carolina; and R. L. Collie, of the North Carolina State Museum. Particular attention was given to the development of the embryo, growth, and morphology of the mandibles and the differentiation of sex. Material for these studies was obtained from the rookeries of the black skimmer on the Georgia coast and from several located in Pamlico Sound, N. C.

The facilities of the station were also utilized by the United States Chemical Warfare Service for tests of wood preservatives, and by the Bureau's Division of Fishery Industries for experiments on the durability of net twines treated with different preservatives. Cooperative tests were continued with the Woolsey Paint Co. in respect to the antifouling value of copper paints, and with the Tropical Paint & Oil Co. on the suitability of bakelite varnishes for marine use.

Terrapin culture.—Operations for the propagation of the diamondback terrapin, conducted in cooperation with the Division of Fish Culture, were unusually successful during the summer of 1934, when a record hatch of 12,416 young was obtained. In addition to this number approximately 1,000 eggs, embryos, and young terrapin were supplied to investigators from Duke University and the State University of Iowa for studies of development and possible control of sex in this species. During the spring of this year 10,445 young terrapin from the 1933 brood were distributed in southern coastal waters in cooperation with the North Carolina Department of Conservation, the South Carolina State Board of Fisheries, and the Georgia Department of Fish and Game.

The system of propagation has recently been modified and improved by simulating natural conditions, so as to permit hibernation of the young terrapin during the winter months in protected outdoor pens. This arrangement has not only reduced the cost and labor of their care in a heated rearing house, as required previously, but has considerably increased the number surviving the critical 9-month period from hatching to liberation. It was first tried with the 1933 brood, of which over 98 percent were grown to a suitable size for distribution. Though record low temperatures occurred during the hibernation period, the total losses of young terrapin in this brood amounted to only 179, as compared with losses ranging from 700 to over 3,000 during previous years.

The annual production of young diamondback terrapin at the Beaufort station hatchery since 1930 has been as follows: 1930, 5,778; 1931, 5,500; 1932, 11,086; 1933, 10,060; 1934, 10,445. These operations have been successful from a practical standpoint since 1912 and have provided over 70,000 terrapin for breeding purposes and restocking of coastal areas. Since the consumption and market demand for terrapin has increased considerably in the last 2 years, it is advisable that artificial propagation of this species be continued and expanded, and an effort made to develop State hatcheries for this purpose.

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PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1935[1]

By Glen C. Leach, *Chief*, and M. C. James, *Assistant Chief, Division of Fish Culture*

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INTRODUCTION

The output of fish and eggs from the Federal hatcheries again showed an upward trend in 1935, in contrast with the curtailment imposed during the fiscal year 1934. The resumption of work at one of the marine hatcheries, made possible by a slight increase in appropriations, together with enlargements and improvements effected by relief funds and labor at other hatcheries, was responsible for a distinct increase in production.

While there still appears to be uncertainty and confusion as to the best means of conserving and perpetuating other forms of wildlife, the operation of hatcheries remains at hand as a proven means of maintaining fish life particularly in interior waters. It is fully recognized that some species under certain conditions have failed to respond to fish-cultural methods, and it is also admitted that stocking may lack effectiveness when it is conducted on haphazard hit-or-miss lines. The fact remains, however, that each game fish planted in lake or stream is an increment to the normal fish resources of that body of water, and eggs of a commercial species fertilized, hatched, and planted as a byproduct of a commercial fishery are an asset of that commercial fishery.

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[1] Administrative Report No. 22, Appendix IV to the Report of the U. S. Commissioner of Fisheries for 1935. Approved for publication, Jan. 14, 1936.

Public acceptance of this fact has resulted in a flood of recommendations and requests urging the general establishment of new hatcheries in all parts of the country. Aside from the fact that funds are not available, either for construction or maintenance of such projects, it is essential to understand that natural limitations very frequently make it desirable to concentrate the propagation work in a few of the larger more efficient hatcheries. The conception of numerous local rearing ponds for the purpose of "finishing off" the hatchery products is sound, but these are much more modest projects than are visualized by the average sportsmen's group interested in securing a Federal or State hatchery for that section. However, the system of Federal hatcheries is as yet incomplete as far as certain sections of the country are concerned, and these sections will be inadequately stocked until some new hatcheries are built.

The following tables and statistics are presented as a listing, in part, of the raw material available for anglers of 1936, 1937, and subsequent years.

SPECIES PROPAGATED

Forty-three different species were propagated in sufficient numbers to warrant a separate listing, and several miscellaneous forms were handled in small numbers largely in an experimental way. Included in the output were pollock which were not propagated during the previous year. No pink or humpback salmon were produced, but a moderate number of cisco or lake herring eggs were secured and hatched. Many of the species shown on the following list are planted directly from the hatcheries, private applicants not participating in this distribution.

- CATFISHES (SILURIDAE):
  - Catfish (*Leptops olivaris*).
  - Spotted catfish (*Ictalurus punctatus*).
  - Horned pout (*Ameiurus nebulosus*).
- CARP (CYPRINIDAE): Common carp (*Cyprinus carpio*).
- BUFFALOFISH (CATOSTOMIDAE): Common buffalo (*Ictiobus sp.*).
- SHAD AND HERRING (CLUPEIDAE):
  - Shad (*Alosa sapidissima*).
- SALMONS, TROUTS, AND WHITEFISHES (SALMONIDAE):
  - Common whitefish (*Coregonus clupeaformis*).
  - Chinook, king, or quinnat salmon (*Oncorhynchus tschawytscha*).
  - Chum salmon (*Oncorhynchus keta*).
  - Coho salmon, silver salmon (*Oncorhynchus kisutch*).
  - Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
  - Steelhead salmon (*Salmo gairdneri*).
  - Atlantic salmon (*Salmo salar*).
  - Landlocked salmon (*Salmo sebago*).
  - Rainbow trout (*Salmo shasta*).
  - Black-spotted trout, redthroat trout (*Salmo lewisi*).
  - Loch Leven trout (*Salmo levenensis*).
  - Lake trout, Mackinaw trout (*Cristivomer namaycush*).
  - Brook trout (*Salvelinus fontinalis*).
- GRAYLINGS (THYMALLIDAE): Montana grayling (*Thymallus montanus*).
- PIKES (ESOCIDAE): Pike and pickerel (Esox sp.).

SUNFISHES (CENTRARCHIDAE):
- Crappie (*Pomoxis annularis* and *P. sparoides*).
- Largemouth black bass (*Micropterus salmoides*).
- Smallmouth black bass (*Micropterus dolomieu*).
- Rock bass (*Ambloplites rupestris*).
- Warmouth bass, goggle-eye (*Chaenobryttus gulosus*).
- Bluegill sunfish (*Lepomis incisor*).
- Green sunfish (*Lepomis cyanellus*).
- Redbreasted bream (*Lepomis auritus*).
- Red-eared sunfish (*Lepomis heros*).
- Common sunfish (*Lepomis gibbosus*).
- Rio Grande perch (*Herichthys cyanoguttatus*).

PERCHES (PERCIDAE):
- Pike perch (*Stizostedion vitreum*).
- Yellow perch, ringed perch (*Perca flavescens*).

WHITE BASSES (SERRANIDAE):
- White bass (*Roccus chrysops*).
- White perch (*Morone americana*).

DRUMS (SCIAENIDAE): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).

CODS (GADIDAE):
- Cod (*Gadus callarias*).
- Haddock (*Melanogrammus aeglefinus*).
- Pollock (*Pollachius virens*).

FLOUNDERS (PLEURONECTIDAE): Winter flounder, American flatfish.

MACKEREL (SCOMBRIDAE): Common mackerel (*Scomber scombrus*).

Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1935

Species	Eggs	Fry	Fingerlings	Total
Catfish	160,000		16,486,300	16,646,300
Buffalofish	191,277,000	46,500	3,380,900	194,804,400
Carp	87,400,000	142,000	8,284,950	95,826,950
Shad		11,430,000	3,350	11,433,350
Whitefish	50,000	39,239,000		39,289,000
Lake herring (cisco)	320,000	2,320,000		2,640,000
Chinook salmon			22,521,000	22,521,000
Chum salmon		15,454,300		15,454,300
Silver salmon	182,700		2,097,000	2,279,700
Sockeye salmon			1,860,100	1,860,100
Steelhead salmon	50,000	47,300	1,153,400	1,250,700
Atlantic salmon	775,000		85,000	860,000
Landlocked salmon			138,950	138,950
Rainbow trout	3,356,630	15,000	9,983,200	13,353,730
Blackspotted trout	3,851,160		22,323,800	26,174,960
Lock Leven trout	9,052,160	7,138,745	5,721,295	21,912,200
Lake trout	2,306,000	1,662,500	106,450	4,074,950
Brook trout	10,159,900	2,080,000	16,299,000	28,538,900
Grayling	1,184,000			1,184,000
Pike and pickerel			36,900	36,900
Crappie			6,967,550	6.967,550
Black bass:				
Largemouth		560,750	2,545,250	3,106,000
Smallmouth		1,147,500	239,900	1,387,400
Rock bass			236,400	236,400
Warmouth bass			36,600	36,600
Sunfish			10,603,300	10,603,300
Pike perch	510,075,000	5,620,000		515,695,000
Yellow perch		451,000,000	491,600	451,491,600
White perch		1,920,000		1,920,000
Freshwater drum			4,400	4,400
White bass			34,660	34,600
Miscellaneous fishes			2,043,700	2,043,700
Mackerel		2,123,000		2,123,000
Cod	1,679,043,000			1,679,043,000
Haddock	236,836,000			236,836,060
Flatfish (flounder)	336,311,600	918,518,000		1,254,829,600
Pollock	309,304,000	95,782,000		405,086,000
Total	3,381,794,450	1,556,246,595	133,683,955	5,071,725,000

PRODUCTION

An increase of approximately 1,800,000,000 in the output of fish and eggs over the previous year's figures was a sharp reversal in the downward trend of production. It is true that more extensive operations with the marine species were largely contributory to the increase, but the output of a number of other species was likewise augmented. Among these were the whitefish, chum salmon, silver salmon, Atlantic salmon, smallmouth bass, sunfish, and yellow perch. During the year only four hatcheries remained entirely out of productive operations, although several others were operated on a restricted basis in comparison with previous years.

There is always interest in the proportion of game fishes included in the total output. For 1935 the strictly game species were propagated to the number of 114,571,550, representing about 2.2 percent of the total. This compares with a larger output of 135,211,900 for 1934. However, the latter year shows the production of fingerlings and larger fish at a larger figure, 133,683,955, an increase of over 7,000,000. This, in part, accounts for the drop in the total output of game fish, since numerical production must inevitably decline when the fish are reared to a greater size before distribution. There is every reason to believe that the increased stocking value of the bigger fish compensates for the smaller numbers planted.

Indulgence in speculative computations will reveal that the output of game fish from Federal hatcheries would yield a prorated catch of 11 fish to each of the estimated 10,000,000 anglers in the country if all fish survived and were taken. Considering that in many sections practically all game fish taken are planted stock, it will be evident that there is little imminence of a "saturation point" in hatchery operations.

CONSTRUCTION ACTIVITIES

At the start of the year there were small unexpended balances in approximately 12 allotments for the repair and reconditioning of fish hatcheries. These allotments had been made by the Public Works Administration during the previous year, and the work was carried to a conclusion during the fiscal year 1935. A considerable proportion of a similar allotment for the continued development of the Leetown, W. Va., experimental hatchery remained available and was expended in part for the construction of bass and trout ponds, remodeling of one of the buildings, and construction of a new dwelling. Early in the year a new Public Works allotment of $75,000 was received for the construction of a pond-fish hatchery at Harrison Lake, Va., 26 miles southeast of Richmond. Work was started during the winter and at the close of the year approximately 15 acres of ponds were virtually completed and other developments were well along to the point where the establishment could go into active operation during the fall of 1935. Arrangements were being made for the propagation of shad as well as pond fish at this point. Two dwellings as well as various service buildings comprised the structural improvements. The water supply, which is obtained from a lake, is fed through a canal. In general, the construction and improvements effected during the fiscal years 1934 and 1935 can be credited in part for the increased hatchery output attained during the latter year. Throughout 1935 labor was assigned to several of the Bureau's stations by local F. E. R. A. offices. Lack of funds for materials made it impossible to perform major construction jobs by this means, but upkeep and maintenance work of real value was accomplished.

COOPERATION WITH OTHER CONSERVATION AGENCIES

The perfection of cooperative relationships with other Federal conservation bureaus, and with many of the State fish and game departments has become such a routine administrative matter that it hardly warrants special mention in this report. In view of the stress laid upon this feature, however, it is desirable to cite a few instances as examples of the possibilities of coordination in fish-cultural work.

The nature of the work performed by the National Park Service, Forest Service, the Office of Indian Affairs, the Bureau of Reclamation, and the Bureau of Biological Survey, gives them of necessity an interest in the Bureau's fish-cultural work. The stocking of streams and lakes under the control of the foregoing agencies is an important feature of their administration. Consequently, it has been necessary to maintain closer contact with these establishments, and it is felt that the Bureau has been of real service in numerous instances.

While these cooperative relationships are of more or less standing nature, there have been contacts with the newer emergency organizations which offer prospects of mutual value. The Agricultural Adjustment Administration, insofar as its work covers the utilization of marginal lands, has called upon the Bureau in several instances to plan a program for fish propagation and the provision of angling.

At the close of the year plans were being developed for one project in North Carolina whereby a hatchery would be constructed and turned over to the Bureau for subsequent operation with the object of providing fish for the surrounding territory.

The Bureau has been called upon to make a survey in the Tennessee Valley to aid the Tennessee Valley Authority in developing a program of conserving fishery resources and establishing a hatchery system.

The United States Army Engineers have given sympathetic consideration to the Bureau's recommendations with regard to developments in the Upper Mississippi River area. This has been based upon a hope that the dams comprising part of the 9-foot channel development might be modified so as to provide extensive propagating ponds for the production of fish native to that area.

With reference to the States, arrangements have been made for several additional States to review Federal applications for fish in order to assure that no undesirable species will be planted, and that the stocking will be in conformity with the natural demands and possibilities of the lakes and streams.

The State of Vermont has afforded generous help in a financial way in meeting the costs of operation at the extensive brook trout egg-producing plant maintained by the Bureau in the White Mountain National Forest, N. H.

Tennessee and West Virginia have furnished food for fish held at the Bureau's hatcheries and have handled the distribution of these fish when they were ready for release.

A number of the Western States have continued to supply helpful cooperation in the collecting of trout eggs and are compensated therefor by receiving a proportion of the eggs taken. There has been a joint operation of trout and shad hatcheries in the State of South Carolina.

The State of Washington donated a site for a trout rearing station which was developed by the Bureau to furnish a supply of fish for the eastern part of the State where we lacked such facilities.

The mutual benefits of these relationships may be exemplified by citing the situation in the State of Indiana. This State has a limited mileage of trout waters but rather than incur the expense of a trout hatchery, it is allotted several hundred thousand trout fry from Federal hatcheries in other States. In return the State utilizes its facilities in distributing practically all of the fish produced at the Federal hatchery at Rochester, Ind.

The machinery through which these plans became effective is the National Planning Council of Federal and State Fisheries Authorities. The several regional meetings of the organization held during the year have brought about results fully justifying its formation.

The Bureau has been less active in sponsoring the establishment of fish rearing ponds or nurseries to be maintained and operated by private sportsmen's organizations. This movement is well developed now and while fish from Federal hatcheries are always available for suitable club nurseries, it is felt that the initiative should be taken by the groups which are to benefit most. We have continued to furnish assignments to nurseries which have been in operation for several years. Special effort has been made to render informational service by supplying technical data upon the problems of fish rearing, and acting in an advisory capacity. In this connection it is possible to be of as great service by pointing out the futility of attempting to rear fish under adverse conditions, as it is to lay out a rearing plant and formulate a program for its operation. The artificial propagation of fish is enough of a technical enterprise to require the supervision of technical men to give best results.

The extent of the cooperative relationships with private clubs operating rearing ponds and nurseries was practically unchanged so far as the number of organizations was concerned. Sixty-seven units received fish in comparison with 62 during the previous year. However, the total number of fish assigned was considerably reduced, allotments amounting to 1,750,000, a reduction of more than a million from the assignments made the previous year. This is attributed to increased rearing facilities at the Bureau's own stations, and the fact that better results are obtained by avoidance of overstocking of private rearing ponds.

SALVAGE OPERATIONS

By the expenditure of a few cents per thousand fish, it is possible to transfer tens of millions of fish which face sure destruction in the overflowed sloughs of the Upper Mississippi River, to living waters where they can survive. It has been the practice each year to salvage these bass, sunfish, crappie, perch and other game and commercial fish, as one of the chief activities in the administration of the Upper Mississippi Wild Life Refuge. The magnitude of the work varies according to river conditions, and in 1935 over 47,000,000 fish were rescued in comparison with 23,873,000 handled the previous year. Only 105,000 were used in restocking other waters, the balance being restored to the river. Fish raised in artificial controlled ponds are now being more widely used for general stocking purposes. Plans have been prepared for an extensive series of hatchery ponds which will be required when the development of the 9-foot channel will, through the maintenance of constant water levels, have eliminated the necessity of salvaging fish.

Number and disposition of fish rescued, fiscal year 1935

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish rescued
All stations:			
Black bass	62, 615	208, 555	271, 170
Buffalofish		4, 030, 420	4, 030, 420
Carp		8, 423, 000	8, 423, 000
Catfish	20, 350	16, 613, 950	16, 634, 300
Crappie	348	6, 965, 652	6, 966, 000
Drum		4, 400	4, 400
Pike and pickerel		36, 890	36, 890
Sunfish	10, 395	8, 272, 465	8, 282, 860
White bass		34, 660	34, 660
Yellow perch		423, 145	423, 105
Miscellaneous fishes		2, 043, 700	2, 043, 700
Total	105, 668	47, 056, 837	47, 162, 505
Summary by stations:			
Fairport		658, 388	658, 388
La Crosse	24, 764	3, 372, 336	3, 397, 500
Lynxville	1, 990	4, 445, 280	4, 447. 270
Bellevue		6, 021, 650	6, 021, 650
Homer	43, 033	8, 566, 621	8, 609, 704
Marquette	35, 831	23, 886, 494	23, 922, 325
Total	105, 668	47, 056, 837	47, 162, 505

NOTE.—Carp listed herein are returned only to the Mississippi River where a commercial fishery for the species exists. None are planted in game fish waters.

ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

The activity of the Bureau in assigning numerous fish and fish eggs to various State fish and game departments may be likened to a wholesale enterprise. These eggs are delivered both from hatchery brood stock and from collections obtained by trapping wild fish. They are the raw material used in operations at the State hatcheries. Many of them are furnished on an exchange basis or under cooperative arrangements whereby the recipients meet part of the costs of collections, while in other instances they are outright donations. The assignments of eggs and fish to the States in 1935, numbering 562,323,860, were more than in 1934 by 188,440,860.

It may be pointed out further that the Bureau also has an "export" business in eggs and fish. Each year there are several requests for advice and assistance in programs of establishing American fishes in foreign countries. Many of these plans do not materialize due to unsuitable conditions abroad. However, some shipments are occasionally furnished by the Bureau, and the table below shows the extent of this activity during 1935. The assignment of trout eggs to Canada was in compensation for Atlantic salmon eggs furnished by the Dominion. The shipment to Venezuela was especially noteworthy in that there was a high rate of survival (80 percent in case of one species) of varieties which are difficult to transport for long distances.

Assignment of fish and fish eggs to State fish commissions, fiscal year 1935

States and species	Number
Arizona:	
Brook trout	10,000
Rainbow trout	35,000
California: Grayling	5,000
Colorado: Rainbow trout	102,000
Connecticut:	
Lake trout	25,000
Rainbow trout	100,000
Georgia: Rainbow trout	200,000
Idaho:	
Blackspotted trout	25,000
Grayling	370,000
Rainbow trout	18,600
Maine:	
Atlantic salmon	775,000
Brook trout	1,078,000
Massachusetts: Rainbow trout	100,000
Michigan:	
Brook trout	50,000
Grayling	150,000
Montana:	
Brook trout	759,000
Loch Leven trout	1,896,000
Black bass	42,870
Catfish	65,745
Crappie	8,375
Sunfish	33,320
Yellow perch	3,980
Nebraska:	
Brook trout	25,000
Rainbow trout	293,000
Nevada:	
Brook trout	150,000
Rainbow trout	1,008,000
New Hampshire:	
Lake herring	320,000
Rainbow trout	25,000
New Mexico:	
Blackspotted trout	250,000
Chinook salmon	197,000
New York: Rainbow trout	260,000
North Carolina: Rainbow trout	582,000
Ohio:	
Pike perch	510,000,000
Whitefish fry	37,000,000
Oregon:	
Blackspotted trout	250,000
Silver salmon	131,500
Steelhead salmon	50,000
Pennsylvania: Rainbow trout	250,000
South Carolina: Rainbow trout	150,000
Tennessee: Rainbow trout	550,000
Utah:	
Brook trout	101,920
Grayling	150,000
Vermont:	
Brook trout	2,199,550
Rainbow trout	35,000
Washington:	
Blackspotted trout	68,000
Brook trout	167,000
Loch Leven trout	50,000
Rainbow trout	358,000
West Virginia: Brook trout	550,000
Wyoming:	
Blackspotted trout	1,250,000
Lake trout	50,000
Total	562,323,860

Shipments of fish and fish eggs to foreign countries, fiscal year, 1935

Country and species	Eggs	Yearlings, adults
Canada: Blackspotted trout	1,000,000	
Cuba:		
Black bass, largemouth		60
Crappie		114
Warmouth bass		126
Panama:		
Black bass, largemouth		325
Carp		11
Catfish		100
Crappie		25
Sunfish		250
Yellow perch		75
Puerto Rico:		
Rainbow trout	50,000	
Catfish		300
Sunfish		1,800
Venezuela:		
Rainbow trout	50,000	
Bluegill sunfish		105
Carp		130
Crappie		30
Largemouth black bass		235
Yellow perch		75
Total	1,100,000	3,761

TRANSFER OF EGGS BETWEEN STATIONS

While the interhatchery transfer of fish eggs is more or less a routine administrative matter, the following tabulation is cited to demonstrate the extent of this practice. Many of the eggs so transferred are collected from wild fish at suitable locations, and the maintenance of expensive brood stock is avoided. With a sufficient return of fish to parental waters the wild producing stock maintains itself with adequate abundance.

Transfer of eggs between stations, fiscal year 1935

Species	Number of eggs	From—	To—
Blackspotted trout	106,400	Saratoga, Wyo	Bozeman, Mont.
	53,200	do	Hagerman, Idaho.
	104,590	do	Jackson Hole, Wyo.
	53,200	do	Springville, Utah.
	2,000,000	Yellowstone Park, Wyo	Jackson Hole, Wyo.
	250,000	do	Quilcene, Wash.
	100,000	do	Springville, Utah.
Brook trout	260,000	Berkshire, Mass	LaCrosse, Wis.
	1,100,000	Berlin, N. H. (national forest)	Cape Vincent, N. Y., and suburbs.
	253,825	do	Erwin, Tenn.
	2,130,700	do	St. Johnsbury, Vt.
	700,000	do	White Sulphur Springs, W. Va.
	500,000	do	Wytheville, Va.
	400,000	Craig Brook, Maine	Cape Vincent, N. Y.
	350,000	do	Erwin, Tenn.
	600,000	do	Leetown, W. Va.
	50,000	do	Manchester, Iowa.
	360,700	do	Nashua, N. H.
	550,000	do	White Sulphur Springs, W. Va.
	500,000	do	Wytheville, Va.
	451,250	Creede, Colo	Crawford, Nebr.
	301,840	do	Duluth, Minn.
	150,300	do	Hagerman, Idaho.
	200,800	do	Manchester, Iowa.
	422,550	do	Saratoga, Wyo.
	100,450	do	Spearfish, S. Dak.
	1,010,400	do	Springville, Utah.
	359,000	Leadville, Colo	La Crosse, Wis.
	62,000	do	Lake Mills, Wis.
	50,000	Pittsford, Vt	Leetown, W. Va.
	250,000	do	Nashua, N. H.
Chinook salmon	202,800	Clackamas, Oreg	Leadville, Colo.
	100,000	Butte Falls, Oreg	Clackamas, Oreg.
Landlocked salmon	20,000	Craig Brook, Maine	Nashua, N. H.
Loch Leven trout	14,299,400	Ennis, Mont	Bozeman, Mont.
	95,000	Leadville, Colo	Eagle Nest, N. Mex.
	183,000	Ennis, Mont	Meadow Creek, Mont.
Rainbow trout	100,000	Bourbon, Mo	Aquarium, Washington, D. C.
	200,000	do	Crawford, Nebr.
	200,000	do	Flintville, Tenn.
	400,000	do	Saratoga, Wyo.
	567,000	Manchester, Iowa	Bozeman, Mont.
	209,000	do	Creede, Colo.
	92,000	do	Duluth, Minn.
	104,000	do	Hagerman, Idaho.
	107,000	do	Leadville, Colo.
	319,000	do	La Crosse, Wis.
	350,000	do	Northville, Mich.
	61,000	do	Lake Mills, Wis.
	209,000	do	Spearfish, S. Dak.
	201,000	Neosho, Mo	Bozeman, Mont.
	163,000	do	Crawford, Nebr.
	90,000	do	Hagerman, Idaho.
	100,000	do	Leadville, Colo.
	104,000	do	Spearfish, S. Dak.
	50,000	Pittsford, Vt	Leetown, W. Va.
	58,000	Springville, Utah	Hagerman, Idaho.
	100,000	do	Bear Lake, Utah.
Steelhead salmon	50,000	Butte Falls, Oreg	Charlevoix, Mich.

STATION OUTPUT

The following table, showing the producing hatcheries and the output by species of each, carries a total of 77 units of which 43 are main stations and 34 substations. The summary last year showed 83 stations and substations, but for administrative reasons a number of closely related substations such as field stations in the Upper Mississippi River and bass ponds around the Fort Belvoir, Va., station were consolidated as far as reports of output are concerned. Actual changes therefore involved the closure of one main station in Alaska, opening of two in the States, and the actual number of fish producing units was one more than last year, namely, 84. They are located in 38 States, but State lines are entirely disregarded in distributing the output.

The carp listed in the following table comprise fish handled in rescue work, or eggs fertilized and hatched at stations located in that territory. The planting of carp is confined to waters which already support an important commercial fishery for the species and they are not distributed in other waters.

Stations and substations operated and the output of each, fiscal year 1935

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Baird, Calif.: Chinook salmon			1,495,100	1,495,100
Battle Creek, Calif.; Chinook salmon			3,492,000	3,492,000
Mill Creek, Calif.: Chinook salmon			2,369,100	2,369,100
Baker Lake, Wash.:				
Blackspotted trout			94,000	94,000
Brook trout			257,500	257,500
Loch Leven trout			80,500	80,500
Rainbow trout			48,400	48,400
Sockeye salmon			25,900	25,900
Birdsview, Wash.:				
Blackspotted trout			294,400	294,400
Brook trout			180,000	180,000
Loch Leven trout			85,000	85,000
Rainbow trout			137,500	137,500
Silver salmon			413,000	413,000
Sockeye salmon			404,000	404,000
Steelhead salmon			603,000	603,000
Mount Rainier, Wash.:				
Blackspotted trout			250,000	250,000
Brook trout			260,000	260,000
Rainbow trout			93,850	93,850
Berkshire Trout Hatchery, Mass.:				
Brook trout			173,700	173,700
Catfish			4,730	4,730
Smallmouth black bass		786,500		786,500
Boothbay Harbor, Maine:				
Cod	729,168,000			729,168,000
Flatfish		774,000,000		774,000,000
Haddock	120,401,000			120,401,000
Bozeman, Mont.:				
Blackspotted trout	1,001,160		3,408,010	4,409,170
Brook trout			470,410	470,410
Loch Leven trout	6,795,040			6,795,040
Rainbow trout	102,900		423,700	526,600
Ennis, Mont.:				
Blackspotted trout			308,555	308,555
Loch Leven trout	2,257,120	7,138,745	1,138,500	10,534,365
Rainbow trout			168,490	168,490
Glacier Park, Mont.:				
Blackspotted trout			1,372,180	1,372,180
Grayling	509,000			509,000
Rainbow trout			85,060	85,060
Miles City, Mont.:				
Black bass, largemouth			121,945	121,945
Catfish			87,530	87,530
Crappie			53,595	53,595
Sunfish			91,235	91,235
Yellow perch			5,805	5,805
Cape Vincent, N. Y.:				
Brook trout			1,700	1,700
Lake herring (cisco)	320,000	2,320,000		2,640,000
Lake trout	25,000	240,000	1,400	266,400
Black bass, smallmouth			73,240	73,240
Whitefish		679,000		679,000
Barneveld, N. Y.:				
Brook trout			107,100	107,100
Lake trout			16,000	16,000
Landlocked salmon			500	500
Loch Leven trout			2,400	2,400
Rainbow trout			19,630	19,630
Cortland, N. Y.:				
Brook trout			169,575	169,575
Loch Leven trout			36,980	36,980
Rainbow trout			1,610	1,610
Watertown, N. Y.:				
Brook trout			46,630	46,630
Lake trout			66,050	66,050
Loch Leven trout			76,395	76,395
Rainbow trout			1,900	1,900

Stations and substations operated and the output of each, fiscal year 1935—Continued

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Cape Vincent, N. Y.—Continued.				
Rochester, N. Y.:				
Black bass:				
Largemouth			35,235	35,235
Smallmouth			22,200	22,200
Brook trout			400	400
Loch Leven trout			4,740	4,740
Rainbow trout			30,000	30,000
Clackamas, Oreg.:				
Blackspotted trout			75,000	75,000
Brook trout			385,000	385,000
Chinook salmon			2,543,900	2,543,900
Loch Leven trout			305,000	305,000
Rainbow trout			6,000	6,000
Silver salmon	1,200		42,000	43,200
Big White Salmon, Wash.:				
Chinook salmon			4,872,000	4,872,000
Butte Falls, Oreg.:				
Blackspotted trout			447,240	447,240
Chinook salmon			3,825,000	3,825,000
Silver salmon	131,500		137,500	269,000
Steelhead salmon	50,000		352,000	402,000
Little White Salmon, Wash.:				
Chinook salmon			3,872,180	3,872,180
Chum salmon		199,000		199,000
Craig Brook, Maine:				
Atlantic salmon	775,000		85,000	860,000
Brook trout	1,069,000	30,000	700,300	1,799,300
Landlocked salmon			103,800	103,800
Smelt	8,000,000			8,000,000
Crawford, Nebr.:				
Blackspotted trout			483,000	483,000
Brook trout			328,930	328,930
Loch Leven trout			168,125	168,125
Rainbow trout		15,000	603,415	618,415
Black bass, largemouth			26,400	26,400
Catfish			5,950	5,950
Crappie			2,340	2,340
Sunfish			11,100	11,100
Yellow perch			56,075	56,075
Dexter, N. Mex.:				
Black bass, largemouth			146,440	146,440
Catfish			14,000	14,000
Crappie			800	800
Sunfish			58,375	58,375
Duluth, Minn.:				
Brook trout			191,000	191,000
Lake trout		1,422,500	23,000	1,445,500
Loch Leven trout			39,000	39,000
Pike perch		5,620,000		5,620,000
Rainbow trout			23,500	23,500
Whitefish		1,560,000		1,560,000
Edenton, N. C.:				
Black bass, largemouth			41,100	41,100
Crappie			1,200	1,200
Sunfish			13,200	13,200
White perch		1,920,000		1,920,000
Yellow perch		6,600,100		6,600,100
Erwin, Tenn.:				
Black bass, largemouth			1,437	1,437
Brook trout			428,870	428,870
Rainbow trout			56,080	56,080
Rock bass			1,600	1,600
Sunfish			230,000	230,000
Fairport, Iowa:				
Black bass, largemouth		52,500	71,200	123,700
Buffalofish	110,752,600	46,500	124,550	110,923,650
Carp	7,400,000	142,000	264,550	7,806,550
Catfish			20,125	20,125
Crappie			4,200	4,200
Rock bass			7,200	7,200
Smallmouth black bass			15,250	15,250
Sunfish			115,960	115,960
Miscellaneous fishes			8,700	8,700
Flintville, Tenn.:				
Loch Leven trout			20,000	20,000
Rainbow trout			209,650	209,650
Rock bass			10,500	10,500
Sunfish			8,000	8,000
Fort Belvoir, Va.:				
Shad		11,430,000		11,430,000
Yellow perch		451,000,000		451,000,000

Stations and substations operated and the output of each, fiscal year 1935—Continued

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Gloucester, Mass.:				
Cod	949, 875, 000			949, 875, 000
Flatfish	300, 452, 600			300, 452, 600
Haddock	116, 435, 400			116, 435, 400
Pollock	309, 304, 000	95, 782, 000		405, 086, 000
Hagerman, Idaho:				
Blackspotted trout			215, 900	215, 900
Brook trout			384, 500	384, 500
Loch Leven trout			18, 300	18, 300
Rainbow trout	191, 000		789, 900	980, 900
Steelhead salmon			12, 900	12, 900
Salmon, Idaho:				
Blackspotted trout			90, 000	90, 000
Brook trout			15, 000	15, 000
Rainbow trout			652, 100	652, 100
La Crosse, Wis.:				
Black bass:				
Largemouth			152, 590	152, 590
Smallmouth			560	560
Brook trout	75, 000		604, 250	679, 250
Carp			720, 000	720, 000
Catfish			297, 900	297, 900
Crappie			487, 060	487, 060
Buffalofish			270, 000	270, 000
Drum			200	200
Lake trout	2, 281, 000			2, 281, 000
Loch Leven trout			180, 600	180, 600
Pike and pickerel			8, 100	8, 100
Rainbow trout			254, 700	254, 700
Sunfish			537, 125	537, 125
White bass			5, 100	5, 100
Yellow perch			14, 480	14, 480
Miscellaneous fishes			630, 000	630, 000
Bellevue, Iowa:				
Black bass, largemouth			40, 300	40, 300
Carp	44, 000, 000		2, 299, 000	46, 299, 000
Catfish			647, 000	647, 000
Crappie			501, 000	501, 000
Buffalofish	77, 625, 000		1, 417, 000	79, 042, 000
Freshwater drum			540	540
Pike and pickerel			1, 485	1, 485
Sunfish			572, 000	572, 000
White bass			24, 150	24, 150
Yellow perch			3, 705	3, 705
Miscellaneous fishes			515, 000	515, 000
Homer, Minn.:				
Black bass, largemouth			129, 600	129, 600
Buffalofish			10, 770	10, 770
Carp			1, 601, 400	1, 601, 400
Catfish			279, 000	279, 000
Crappie			3, 033, 400	3, 033, 400
Drum			3, 060	3, 060
Pike and pickerel			7, 365	7, 365
Sunfish			3, 599, 165	3, 599, 165
White bass			1, 810	1, 810
Yellow perch			383, 250	383, 250
Lake Mills, Wis.:				
Black bass:				
Largemouth			76, 550	76, 550
Smallmouth			10, 650	10, 650
Brook trout			55, 000	55, 000
Loch Leven trout			57, 500	57, 500
Rainbow trout			46, 000	46, 000
Lynxville, Wis.:				
Black bass, largemouth			5, 170	5, 170
Buffalofish			372, 500	372, 500
Carp			687, 000	687, 000
Catfish			1, 428, 000	1, 428, 000
Drum			600	600
Pike and pickerel			2, 650	2, 650
Sunfish			767, 500	767, 500
White bass			600	600
Yellow perch			4, 900	4, 900
Miscellaneous fishes			841, 000	841, 000
Marquette, Iowa:				
Buffalofish	3, 000, 000		1, 185, 900	4, 185, 900
Black bass, largemouth			54, 000	54, 000
Carp	36, 000, 000		2, 714, 000	38, 714, 000
Catfish	160, 000		13, 675, 000	13, 835, 000
Crappie			2, 733, 000	2, 733, 000
Pike and pickerel			17, 290	17, 290
Sunfish			2, 935, 500	2, 935, 500

Stations and substations operated and the output of each, fiscal year 1935—Continued

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
La Crosse, Wis.—Continued.				
Marquette, Iowa—Continued.				
White bass			3,000	3,000
Yellow perch			16,500	16,500
Miscellaneous fishes			50,000	50,000
Rochester, Ind.:				
Black bass:				
Largemouth			88,815	88,815
Smallmouth			4,790	4,790
Crappie			1,000	1,000
Rock bass			3,000	3,000
Sunfish			20	20
Yellow perch			1,000	1,000
Lamar, Pa.:				
Brook trout			23,875	23,875
Rainbow trout			14,000	14,000
Leadville, Colo.:				
Blackspotted trout			364,800	364,800
Brook trout			2,661,150	2,661,150
Loch Leven trout			135,000	135,000
Rainbow trout			325,000	325,000
Creede, Colo.				
Blackspotted trout			498,000	498,000
Brook trout	3,809,000		1,837,750	5,646,750
Loch Leven trout			179,000	179,000
Rainbow trout	75,000		1,008,000	1,083,000
Eagle Nest, N. Mex.:				
Brook trout			42,000	42,000
Rainbow trout			210,500	210,500
Leetown, W. Va.:				
Brook trout			275,530	275,530
Loch Leven trout			26,000	26,000
Rainbow trout			210,270	210,270
Smallmouth black bass		10,000		10,000
Louisville, Ky.:				
Black bass:				
Largemouth		210,000	21,610	231,610
Smallmouth		133,000	5,040	138,040
Crappie			215	215
Rock bass			4,250	4,250
Sunfish			20,400	20,400
Mammoth Spring, Ark.:				
Black bass:				
Largemouth		17,000	326,300	343,300
Smallmouth		210,000	38,250	248,250
Rock bass			123,600	123,600
Sunfish			27,300	27,300
Manchester, Iowa:				
Brook trout			186,650	186,650
Loch Leven trout			49,500	49,500
Rainbow trout			134,870	134,870
Rock bass			7,500	7,500
Smallmouth black bass			10,590	10,590
Nashua, N. H.:				
Brook trout			188,100	188,100
Landlocked salmon			11,000	11,000
Loch Leven trout			8,000	8,000
Rainbow trout			20,575	20,575
Catfish			10,000	10,000
Smallmouth black bass			700	700
Neosho, Mo.:				
Black bass, largemouth			39,440	39,440
Catfish			1,700	1,700
Crappie			24,900	24,900
Rainbow trout	853,000		5,510	858,510
Rock bass			53,300	53,300
Sunfish			77,330	77,330
Yellow perch			400	400
Bourbon, Mo.: Rainbow trout	1,036,000			1,036,000
Natchitoches, La.:				
Black bass, largemouth			55,735	55,735
Sunfish			71,755	71,755
Warmouth bass			3,600	3,600
Tishomingo, Okla.:				
Black bass, largemouth			77,880	77,880
Catfish			16,200	16,200
Crappie			106,600	106,600
Rock bass			29	29
Sunfish			116,655	116,655
Warmouth bass			24,900	24,900
Yellow perch			5,600	5,600

Stations and substations operated and the output of each, fiscal year 1935—Continued

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Northville, Mich.:				
Black bass:				
Largemouth			2,275	2,275
Smallmouth			51,000	51,000
Brook trout			336,300	336,300
Loch Leven trout			270,665	270,665
Rainbow trout			365,200	365,200
Steelhead salmon		47,300		47,300
Orangeburg, S. C.:				
Black bass, largemouth			258,400	258,400
Catfish			310	310
Crappie			1,040	1,040
Shad			3,350	3,350
Sunfish			160,340	160,340
Warmouth bass			7,970	7,970
Pittsford, Vt.:				
Blackspotted trout			15,000	15,000
Brook trout			44,700	44,700
Rainbow trout			15,900	15,900
Put in Bay, Ohio:				
Pike perch	510,075,000			510,075,000
Whitefish	50,000	37,000,000		37,050,000
Quinault, Wash.:				
Blackspotted trout			234,520	234,520
Brook trout			121,010	121,010
Chinook salmon			57,800	57,800
Silver salmon	50,000		1,513,500	1,563,500
Sockeye salmon			1,183,800	1,183,800
Duckabush, Wash.: Chum salmon		13,993,300		13,993,300
Quilcene, Wash.:				
Blackspotted trout			250,000	250,000
Brook trout			59,000	59,000
Chum salmon		1,262,000		1,262,000
Sockeye salmon			250,000	250,000
Steelhead salmon			185,500	185,000
National Forest of N. H.:				
Brook trout	2,000,000	2,050,000	489,600	4,539,600
Landlocked salmon			635	635
St. Johnsbury, Vt.:				
Black bass, smallmouth			9,765	9,765
Landlocked salmon			23,100	23,100
San Marcos, Tex.:				
Black bass, largemouth		176,000	151,140	327,140
Crappie			5,275	5,275
Sunfish			46,600	46,600
Fort Worth, Tex.:				
Black bass, largemouth			58,000	58,000
Catfish			3,700	3,700
Crappie			12,800	12,800
Sunfish			76,900	76,900
Saratoga, Wyo.:				
Blackspotted trout			349,470	349,470
Brook trout			1,157,165	1,157,165
Loch Leven trout			229,060	229,060
Rainbow trout			121,400	121,400
Spearfish, S. Dak.:				
Black bass, largemouth			14,575	14,575
Blackspotted trout			130,200	130,200
Brook trout			563,350	563,350
Loch Leven trout			715,000	715,000
Rainbow trout	50,000		945,550	995,550
Springville, Utah:				
Black bass, largemouth			2,110	2,110
Blackspotted trout			640,000	640,000
Brook trout	101,900		249,200	351,100
Loch Leven trout			1,514,440	1,514,440
Rainbow trout	1,068,630		427,220	1,495,850
Bear Lake, Utah:				
Brook trout			498,100	498,100
Rainbow trout			71,420	71,420
Sockeye salmon			263,000	263,000
Marion, Ala.:				
Black bass, largemouth			172,850	172,850
Sunfish			201,400	201,400
Tupelo, Miss.:				
Black bass, largemouth		50,500	181,000	231,500
Sunfish			225,900	225,900

Stations and substations operated and the output of each, fiscal year 1935—Continued

Stations and substations and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Valdosta, Ga.:[1]				
Warm Springs, Ga.:				
Black bass, largemouth		3,750	174,350	178,100
Catfish			2,970	2,970
Crappie			115	115
Sunfish			417,650	417,650
Warmouth bass			125	125
White Sulphur Springs, W. Va.:				
Black bass, largemouth		51,000	550	51,550
Brook trout			1,926,675	1,926,675
Loch Leven trout			381,630	381,630
Rainbow trout	221,000		525,300	746,300
Rock bass			7,025	7,025
Sunfish			39,025	39,025
Woods Hole, Mass.:				
Flatfish	35,859,000	144,518,000		180,377,000
Mackerel		2,123,000		2,123,000
Wytheville, Va.:				
Black bass:				
Largemouth			7,900	7,900
Smallmouth			7,670	7,670
Brook trout			786,360	786,360
Catfish			1,725	1,725
Rainbow trout	795,000		893,900	1,688,900
Rock bass			18,400	18,400
Sunfish			74,900	74,900
Yellowstone Park, Wyo.:				
Blackspotted trout	2,850,000		11,767,000	14,617,000
Grayling	675,000			675,000
Moose, Wyo.:				
Blackspotted trout			1,386,000	1,386,000
Brook trout			92,200	92,200

[1] No output due to construction work.

NOTE.—Figures for "eggs" denote eggs planted or transferred to agencies outside of Bureau. Eggs transferred to other Bureau stations are shown separately by table on page 409.

EGG COLLECTIONS

As would be expected, the increased output of fish was based upon a larger collection of the raw material, namely, fish eggs. The attached tables give comparison of the 1935 and 1934 collections indicating in which species variations occurred.

Comparison of egg collections, fiscal years 1934 and 1935

Species	1934	1935	Species	1934	1935
Shad	17,104,000	5,280,000	Grayling	2,118,400	
Whitefish	12,000,000	54,895,000	Pike perch	840,920,300	519,075,000
Chinook salmon	28,323,000	29,919,000	Yellow perch	6,430,000	14,000,000
Chum salmon	12,370,000	21,138,000	White perch	1,600,000	2,400,000
Humpback salmon	158,000		Cod	1,037,262,000	1,753,129,000
Silver salmon	2,148,000	3,398,000	Haddock	291,754,000	264,483,000
Sockeye salmon	9,157,000	3,326,000	Pollock		523,622,000
Steelhead salmon	905,000	1,352,000	Winter flounder	1,036,626,000	1,375,129,000
Landlocked salmon	35,000		Mackerel	8,592,000	2,800,000
Rainbow trout	25,770,253	21,365,920	Lake herring		5,520,000
Blackspotted trout	28,946,550	21,206,000	Carp		83,250,000
Loch Leven trout	29,329,624	30,372,000	Buffalofish		214,046,000
Lake trout	1,850,120	2,684,000			
Brook trout	28,331,758	29,265,500	Total	3,315,039,305	4,981,655,420

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmons.—While there was a moderate increase in the production of the less important species of Pacific salmon, the silver and chum, the output of chinook and sockeyes dropped. The distribution of the latter in particular was but a small fraction of the normal production of preceding years. This was due to cessation of operations in Alaska where sockeye eggs have been obtainable in large numbers. In addition, the run of sockeyes at the Quinault, Wash., station was negligible. This station is the main field of activity with this species outside of Alaska.

In the Columbia River territory operations proceeded in approximately normal scope, but a light run of fish in the Big and Little White Salmon Rivers curtailed the output of chinook salmon. Effort was made to augment the water supply at the main station (Clackamas, Oreg.) by digging a well without success. Some new rearing tanks were constructed. At the Butte Falls, Oreg., substation serving the Rogue River territory, chinook egg collections were good but the operations with steelhead trout were unsatisfactory due to the immaturity of the eggs when the fish entered the traps.

The Salmon, Idaho, substation was operated on a part-time basis, chiefly for the handling of rainbow trout eggs.

Total egg collections at the Birdsview, Wash., station were below last year's take. A number of improvements, including completion of a dwelling, work upon Grandy Creek and the water-supply system, traps, etc., as well as minor jobs, were effected by relief labor. Sockeye salmon marking experiments were continued.

The Baker Lake substation was operated during the summer and fall months only and propagated only trout. A rock-slide arising from flood conditions blocked the water supply and Civilian Conservation Corps labor was obtained to remove it. The Mount Rainier, Wash., substation furnished about 600,000 trout for park waters. Effort is being made to develop egg-collecting fields in several lakes in the national park.

The most noteworthy item at the Quinault, Wash., station was the greatly reduced run of sockeye salmon. However, sufficient eggs of various species were obtained to utilize to capacity the rearing facilities of the station.

The Duckabush and Quilcene, Wash., substations as usual concentrated on the handling of chum salmon. Repeated damage to racks and traps by high water affected operations, but in spite of this a large collection of late-run chum salmon eggs was obtained.

In the California field the collection of chinook salmon eggs was concentrated at the Mill Creek substation. Of the 4,000,000 taken, 1,500,000 were transferred to the Baird station for incubation.

GREAT LAKES SPECIES

Comparable to last year, propagation of commercial species of the Great Lakes was confined to the Duluth, Minn., Put in Bay, Ohio, and Cape Vincent, N. Y., stations. The former succeeded in collecting a moderate number of lake trout and whitefish eggs during the regular open season. The quality of them was rather poor, due to lateness of the collecting season. A considerable number of game-trout eggs were hatched, part of the fish being used in stocking rearing ponds constructed by the United States Forest Service. The State of Minnesota furnished a limited number of pike-perch eggs during the spring.

At the Cape Vincent, N. Y., station eggs of whitefish, lake trout, and lake herring, yielding slightly over 3,000,000 fry, were obtained from local fishermen. The main activities here are now concerned with the propagation of game fish, particularly smallmouth bass, and the administration of the three substations where trout are reared. This work has continued to be of increasing importance. The pike-perch hatchery on Lake Champlain at Swanton, Vt., was operated jointly by the States of Vermont and Connecticut.

The work at the Put in Bay, Ohio, station was closely tied in with that of the State hatchery. The Bureau collected 51,000,000 whitefish eggs, which were hatched and distributed from the State hatchery. During the spring over 500,000,000 pike-perch eggs were collected by the Bureau's force, with State facilities being used for hatching. The dock at the Bureau's station has disintegrated to the point where it is no longer safe for use. The Bureau's vessel *Shearwater* is now operated by the State, serving both hatcheries.

MARINE SPECIES

At the Boothbay Harbor, Maine, station one of the steam pumps and boilers was replaced by an electric pump, adding greatly to the efficiency and economy of operations. A new hot-water system was also required and installed as a result of this change. The flatfish propagation was conducted in the usual manner. However, a larger number of brood fish yielded a smaller number of eggs than during the previous year. Operations with the cod and haddock consisted of fertilizing and planting on the spawning grounds eggs taken in connection with commercial fisheries. The 729,000,000 cod eggs and the 120,000,000 haddock eggs thus handled were really a byproduct recovery.

At Woods Hole, Mass., a new water-supply suction line was installed. Due to shortage of funds, no cod were propagated, but 144,000,000 flounder fry were produced, together with a limited number of mackerel.

The Gloucester, Mass., station was reopened early in July after a 9-month closure. Considerable work was required in overhauling boilers, pumps, fish-cultural equipment, and in renovating the buildings, all of which were deteriorated. Everything was placed in readiness to permit propagation of pollock during the winter months. Part of the one-half billion eggs secured were planted on the spawning grounds directly from the fishing boats, the balance being incubated at the hatchery. In the spring the work of planting fertilized cod, haddock, and flounder eggs was taken up. Spawntakers placed aboard commercial fishing vessels encountered unusually favorable conditions, and large numbers of eggs were obtained. This station is of chief value in maintaining a local inshore fishery.

ANADROMOUS SPECIES OF THE ATLANTIC COAST

The propagation of commercial species native to east coast rivers was formerly much more extensive, but changing conditions accompanying development and industrialization have rendered such work futile in many sections. Accordingly, the propagation of Atlantic salmon was confined to the Craig Brook, Maine, station, while work with the shad was centered on the Potomac River at the Fort Belvoir, Va. (formerly Fort Humphreys) station. It was again possible to secure 1,000,000 Atlantic salmon eggs from Canada, and these were distributed to various State hatcheries in Maine, with the exception of a limited number hatched at the Federal hatchery at Craig Brook. This procedure was followed for greater economy and efficiency in distribution.

The Fort Belvoir, Va., hatchery bettered last season's production of shad and resumed propagation of yellow perch with a very satisfactory production of over 400 million fry. This work does not conflict with shad operations but is rather supplementary and involves slight extra cost. Some minor improvements were made to the station buildings and grounds.

At the Edenton, N. C., station, yellow perch and white perch, as well as shad, were handled. Eight and a quarter million eggs of the former species were obtained. The commercial shad fishery from which the shad eggs are obtained was not particularly successful, and the output of fry amounted to only three and a half million. The station also propagated pond fish.

The Orangeburg, S. C., station again operated a small shad hatchery on the Edisto River as a cooperative project with the State of South Carolina.

GAME-FISH PROPAGATION

Artificial propagation of commercial species is largely a replenishment process, supplementing natural production. This is true with the game varieties also but in addition virtual extinction of certain species in certain sections is forestalled by the hatchery activities.

The Bureau's game fish hatcheries were operated with the conception that they were producing the basis of a great national recreation, and the areas devoted to recreation—the national parks and forests—were the subject of special attention. The numerical output of these varieties has been discussed elsewhere. The rising cost of the meats commonly used as fish food has constituted the most serious problem confronting this phase of our work. The requirements for larger fish necessitate feeding for long periods and rigid economy is essential if the game fish output is to be kept up in size and numbers. Distribution of the fish affords one of the best fields for cost reduction; and by using State facilities, as well as requiring private applicants to handle their allotments, production has been maintained at a high level. The findings of the Bureau's biologists engaged in aquicultural investigations have been applied at the hatcheries wherever practicable. The following summaries covering the work of the individual stations will, however, illustrate more fully the nature of the year's work.

ROCKY MOUNTAIN TERRITORY

At the close of the year all arrangements were being put into effect for the consolidation of the Rocky Mountain and Pacific coast territories to be administered by a regional director located at Seattle, Wash.

The activities at the Yellowstone Park substation were administered from the Salt Lake City headquarters. Inasmuch as the work covering the midsummer months extends into parts of two fiscal years, the data furnished here cover the summer of 1934. The total collection of black-spotted trout eggs exceeded 38,000,000, surpassing any previous season. Over 4,000,000 grayling eggs were also collected. The destruction of penned fish and pens by bears was halted by simply keeping dogs in the vicinity of the racks. The larger percentage of the output was retained for restocking in Yellowstone Park or in other national parks. A new water supply line was installed.

At the Springville, Utah, station the brood stock of rainbow trout yielded over 2,000,000 eggs, an increase of almost half a million over last year. A 1¼-acre bass pond was completed with relief labor.

The Bear Lake, Utah, substation handled about 1,300,000 trout eggs. Some losses were experienced in rearing the fry and fingerlings. This was traced to excess nitrogen in the water and was corrected by aeration. The station hatched about 250,000 landlocked sockeye salmon known as "silver trout", for planting in local waters.

The Spearfish, S. Dak., station received over 10,000 hours of relief labor which was utilized in overhauling the pond system, renewing the water supply system, and numerous improvements to buildings and grounds which have greatly improved the efficiency and appearance of the plant. Approximately 7,300 cans of trout fingerlings were distributed providing for ample stocking of the territory served by this hatchery.

The Saratoga, Wyo., station was able to accomplish little in the way of major improvements, although a small Civilian Conservation Corps detail was used in building a wall along the creek through the station grounds. Fish-cultural work was conducted at a normal level with a good take of black-spotted trout eggs from station brood stock.

In the Colorado field, the Leadville station has partially completed a new rearing pond. This station together with the substation at Creede cooperated with private parties in the collection of trout eggs, and the two establishments handled over 12½ million eggs. The substation at Crystal Lake was used chiefly for rearing purposes. A 1½-acre earth rearing pond was constructed at Creede with Civilian Conservation Corps labor. Flood waters destroyed a dam in a storage reservoir at the Leadville station, affecting the power plant water supply.

At the Hagerman, Idaho, station a cold-storage room was installed, power being generated on the premises. Some work was done on overhauling the living quarters. While there was considerable loss on eggs shipped in from other points, operations as a whole were satisfactory and the rapid growth of the fish at this station makes it a valuable unit.

The Salmon, Idaho, substation was operated during the summer months for the rearing of fish derived from egg collections at Williams Lake. The take of over 3,500,000 eggs at this point exceeded all previous records.

Civilian Conservation Corps labor was available at the Crawford, Nebr., station for repairs and improvements to bass and trout ponds on the Fort Robinson Reservation.

The extensive operations in the Montana territory were highly successful.

Through assignments of relief workers and an assignment from the Civilian Conservation Corps, a limited amount of construction and repair work was carried on at the Bozeman, Mont., station. Such work consisted of repairing and graveling the roadways about the station and public highway, renewing the concrete floor in the hatchery building and equipping same with new troughs, constructing a fish-food-preparation house, and completing one apartment of a duplex cottage.

Distribution of trout eggs and fingerlings was made in the usual territory consisting of 15,022,430 eggs and 4,378,900 fingerlings, 1,946,674 more fingerlings being distributed during the year than the previous fiscal year.

At the Ennis substation repair work and construction was carried on by the regular personnel and with temporary help. A new concrete floor was put in the Meadow Creek hatchery; also 20 cedar troughs with wooden standards were set up in the building. At Blaine Springs 400 feet of supply pipe was put in, and a rearing pond 100 by 12 feet was constructed.

The Loch Leven egg collections totaled 25,511,655, which was approximately 3,000,000 less than the previous year. However, the take was ample to meet all requirements. The rainbow take during the spring was a few thousand larger than the previous year.

The Blaine Springs hatchery has been in operation for over a year and has proven satisfactory in every detail. With the water of a 53° temperature, a rapid growth among the fingerling trout is encouraged.

At the Miles City, Mont., substation relief workers were used in repairing a leak in the dam of Lake Keogh, which necessitated an excavation of gravel 60 feet long, 8 feet deep, and 5 feet wide and replacing the gravel with dirt that would pack and form a compact mass.

The total number of fingerlings harvested during the fall ranked among previous years, but the most outstanding feature of the harvest was that 121,525 fingerling bass were distributed.

The Dexter, N. Mex., station is the only Federal hatchery in this territory which is solely concerned with the production of pond fish. No majoı construction was performed, but considerable work was applied to improving ponds, particularly the drainage. Unfavorable weather during the spawning season resulted in a subnormal hatch of fry. Maintenance of adequate water levels in the ponds is always a problem at this station.

Among the miscellaneous activities was the establishment of rearing pools on a site near Spokane, Wash., donated by the State. Under a cooperative agreement with the adjacent State hatchery, a Bureau employee has been detailed to care for the trout during the rearing period.

The Jackson Hole, Wyo., station received fingerlings by transfer and also hatched eggs. During the spring months mortality was very heavy and other difficulties were experienced. However, a goodly number of fingerlings was available for stocking waters in the Teton National Park.

NEW ENGLAND STATIONS

The Nashua, N. H., station functioned in a normal manner and achieved an average production of three species of trout and landlocked salmon.

The Hartsville, Mass., station collected nearly 500,000 brook-trout eggs, sufficient for its own requirements and also providing for shipments of several hundred thousand to other stations. The cooperative collection of smallmouth bass fry from waters supplying reservoir lakes was most successful. Seven hundred and sixty-eight thousand fry were collected and distributed, 50 percent being at the disposal of the State of Connecticut in conformity with the existing agreement.

The East Orland, Maine, station took 6,860,000 brook-trout eggs from station stock. This was below the figure for the previous year due to the fact the brood stock is being reduced. Three hundred thousand landlocked salmon eggs were furnished by the State of Maine, and by exchange Canadian Atlantic salmon eggs to the number of 1,000,000 were obtained. An agreement was consummated with the State of Maine for the joint distribution of trout and salmon, and the output was moved at negligible cost to the Bureau. A few smelt eggs were handled. Some improvement and repair work was performed upon the ponds and water-supply system, including a start on the construction of two circular rearing ponds.

By continuation of the use of Civilian Conservation Corps labor and relief labor, the long-range development program for the York Pond, N. H., brook-trout station was brought nearer to completion. The nature of the work accomplished is too extensive for description here but one of the most important features was a new bulkhead at the outlet of York Pond and a new canal system for the power house. Realinement of rearing ponds, landscaping, and numerous minor jobs were prosecuted. Due to the disturbances arising from construction, the collections of brook-trout eggs were slightly less than last year. A cooperative arrangement in effect with the State of Vermont has resulted in financial aid to the program of rearing and distribution carried on from this station. The St. Johnsbury, Vt., station has been used as an auxiliary principally in handling the eggs destined for shipment from York Pond. The St. Johnsbury station enjoyed unusual success in the rearing of landlocked salmon during the year. The hatchery building was repainted.

The Pittsford, Vt., station, in addition to its strictly experimental work, produced some brook-trout eggs for shipment and distributed a considerable number of fingerling trout. It is rearing several varieties not native to New England, including grayling and golden trout, and has a stock of the rare Sunapee, or white trout.

COMBINATION TROUT AND POND-FISH STATIONS

At the Northville, Mich., station eight daphnia ponds were constructed for the production of bass food. Relief labor was used to complete the bass ponds and grade the station grounds. A satisfactory production of trout and bass was obtained. The Conservation Departments of Indiana, Michigan, and Ohio cooperated in the distribution of the output in their respective States. Five rearing projects handling about 450,000 trout were operated under the direction of this station.

At the Neosho, Mo., station the fall and summer collections of pond fish were approximately as during the previous year. The spring collections of largemouth bass were only 10 percent of those of last year, due to almost constant rains, which broke up the bass schools, and to cool weather.

Ichthyophthirius developed at Neosho and became epidemic for the first time in 10 years. Selective breeding of rainbow trout has been continued along the lines previously reported. The distribution of trout was adequate to meet all requirements for that section.

At the Bourbon, Mo., substation the production of eyed rainbow eggs was approximately the same as that of last season and the hatching and rearing of the rainbow trout has been most successful. This substation is operated upon a cooperative basis by this Bureau in connection with the owners of the property. By agreement the Bureau receives 90 percent of all rainbow spawn.

Owing to a reduction in the brood stock the output of the Manchester, Iowa, station was considerably reduced from that of last year. Three thousand brood rainbow trout yielded 2,496,000 eggs. Consignments totaling 2,000,000 eyed eggs were shipped to applicants, State or Government establishments. The smallmouth black bass and rock bass produced a fair yield of eggs, and 10,860 large fingerling smallmouth bass, and 7,500 rock bass were distributed.

The Leetown, W. Va., station was engaged in numerous experimental activities which are discussed in the Report of the Division of Scientific Inquiry. However, over 600,000 fry, fingerlings, and adults were distributed. The hatch of trout eggs was poor due to carbon dioxide in the water supply. Other diseases were noted during the year and appropriate remedial measures applied. The station produced its first hatch of bass and has experimented with the rearing of the fry in trout ponds. Construction performed included the claying of the bottoms of seven bass ponds and the construction of one new pond. Concrete bottoms were placed in two long trout raceways. A dwelling for the director was completed during the year, and work was started on a fish culturist's cottage.

The new Lamar, Pa., station was in active operation although no fish were hatched. Trout fry transferred from other stations were reared, producing over 50,000 good-sized fish for distribution. Eight circular rearing ponds and four 50-foot raceways were constructed, and property lines were fenced. Several hundred feet of road were constructed.

The Flintville, Tenn., station has reduced its rainbow brood stock with consequent reduction in egg take. Surplus fish were turned over to the State. Production of pond fish was limited due to the fact that wild brood stock from Reelfoot Lake had not become fully acclimated.

Operations at the Erwin, Tenn., station were of a routine nature. Cooperative arrangements for the rearing of trout were in effect with sportsmen's organizations and the State.

At the White Sulphur Springs, W. Va., station painting of the station buildings was completed. A smaller number of eggs was secured from rainbow brood stock than was the case the previous year, but the percentage of the hatch was higher. Almost 100,000 pond fish were produced, an increase of 36,000. The station hatched trout eggs for the State of West Virginia, as has been done previously.

The total distribution of all species from the Wytheville, Va., station was slightly below the previous year, but as a whole the year's work was satisfactory. Large numbers of eggs and fish were assigned to the States of Virginia and North Carolina.

POND-FISH STATIONS

The hatcheries engaged in the culture of the warm-water or pond fishes are essentially a series of artificial ponds stocked with brood fish. The real fish-cultural work, therefore, lies in the management applied to these ponds. The output is somewhat at the mercy of weather and other uncontrollable factors; and, aside from fluctuations in production, a recital of station activities is largely a statement of routine.

At the Warm Springs, Ga., station reconditioning of buildings and grounds was continued with relief labor or funds. An old building was razed and the material used for other repairs. Two retaining walls were erected, and work was performed upon the ponds. The output of fish was slightly less than last year.

At Valdosta, Ga., construction work prohibited any production of fish. The construction activities included a reinforced concrete dam and necessary structures at the outlet giving complete control of the drainage wells. Eight thousand feet of ditches were excavated to facilitate drainage of the lake. Four holding pools were created by erecting dykes and concrete outlets in the bed of the lake. Other work comprised improvement of the holding shed and its water supply, fencing, roads, etc.

At the San Angelo, Tex., station, operated under the jurisdiction of the San Marcos, Tex., station, a dwelling, shop, and garage were completed and two ponds developed to the point where fry could be transferred to them for rearing.

At the Orangeburg, S. C., station two small mud ponds were completed. A number of the buildings were painted. The production of fish approximating a total of 500,000 was more than 100,000 in excess of last year's output. The cooperative shad work on the Edisto River gave very limited results, however.

At the Marion, Ala., station results in fish-cultural work this year were gratifying both as to the size and numbers of fish produced. A total of 434,280 fingerlings were delivered to applicants and 116,500 bass were planted in station rearing ponds. No fish were handled in the advanced fry stage this year. During the year 8 additional ponds were constructed covering a total of 28.73 acres, increasing the pond system to 51 ponds with a total water area of 100 acres. Another flowing well was brought in during the fall, and there is now sufficient water to supply ponds additional to those already constructed. Construction of buildings was continued during the first half of the year and there were completed during this period, one brick veneer dwelling, one large frame barn, two small barns, and one shipping shed. A large log cabin at Perry Lake, on the east side of the property and 1 mile from the office, was nearly completed. A telephone line was constructed to Marion, a distance of 7 miles.

Adverse weather conditions at the Louisville, Ky., station, with other unusual factors, caused a decrease in the output of smallmouth bass fry. During the year 133,000 smallmouth bass fry and 5,070 fingerlings were distributed, as well as 210,000 largemouth bass fry and 21,611 fingerlings. The latter were produced in increased numbers.

Considerable excavation of earth from upper portions of ponds, the uncovering of water supply and sewer lines for leaks; also other construction work such as pouring a 4-inch concrete wall through embankments of ponds to prevent crayfish from tunneling from one pond to another, the widening of pond A, and other necessary work have been accomplished with labor furnished by the local welfare agency.

The Fairport, Iowa, station has become of increasing importance in the production of pond fish required to meet applications formerly filled with rescued fish. Relief labor was employed for a complete renovation of the pond system and other activities incidental to maintenance.

At the Tishomingo, Okla., substation the pond area has been increased during the past year by workers from the Federal Emergency Relief Administration so that at present there are 33 acres in ponds. Four miles of standard grade 40-foot highway was constructed to the station by the State. Interest is centered on the production of channel catfish at this hatchery and to date the work has been fairly successful.

At the Natchitoches, La., station the production has been approximately the same as during the previous year. Experiments are being conducted with fertilizers, their use and quantity per acre in order to procure data to determine the best methods of quantity production of pond fishes. The pond area of this station is being increased through the work of the Federal Emergency Relief Administration and this new area will be in production during the spring of 1936.

MISSISSIPPI RIVER TERRITORY

Fisheries matters in the Upper Mississippi Wild Life and Fish Refuge, and hatchery activities in the North Central States were supervised from the La Crosse, Wis., headquarters. This station hatched successfully over a million game trout and operated several bass ponds at the hatchery and in the adjacent territory. In addition, it supervised the rescue or salvage work in the refuge (discussed elsewhere) and cooperated in the collection of lake trout eggs in the Illinois waters of Lake Michigan. Three large trout rearing units in the national forests were stocked or supervised from this point, and the work also included supervision and stocking of private cooperating rearing ponds at 39 different locations in nearby States.

The construction of dams as a part of the 9-foot channel project for the Mississippi River is greatly changing conditions in this vicinity. Several semicontrolled ponds used for rearing bass have already been rendered useless and certain parts of the territory formerly covered by rescue crews are being flooded. As construction progresses these effects will be extended. The Bureau has developed plans for construction of propagating ponds adjacent to the new dams but no funds have been obtainable for the carrying out of these plans.

The Homer, Minn., substation affords shop and repair facilities for overhauling equipment and was used for this purpose as well as a center for rescue work.

The new Rochester, Ind., hatchery, in its second year of production, received the benefit of relief labor throughout the greater part of the year. This resulted in creation of additional ponds to the extent of more than 6 acres and the partial completion of another pond. Minor jobs required for the completion of the dwellings and other buildings were attended to. Due to drought conditions, the water supply was inadequate to maintain the ponds throughout the season and the fish were distributed in July and August, thereby reducing the output of larger fish.

At the Lake Mills, Wis., substation there was a production of trout and pond fish commensurate with the facilities available.

AQUARIUM

The aquarium located under the main lobby in the Department of Commerce Building is maintaining its reputation as one of Washington's popular points of interest for visitors. The numerous organizations which gather for conventions in Washington, as a rule, include the aquarium in their itinerary of sightseeing.

The general exhibits were maintained in much the same manner as during the previous year and the display of trout has continued to be a point of particular interest. However, from time to time during the year it has been the practice to introduce more novel exhibits, one of which was a 500-pound green turtle. Another interesting novelty was a pair of piranha—the small man-eating fish of the Amazon Basin.

The number of specimens and species on display have varied from time to time, but as a rule from 1,500 to 2,000 individual specimens representing more than 50 different varieties are shown. Replacement specimens were obtained from several of the Bureau hatcheries, the majority being obtained from the La Crosse, Wis., territory.

The aquarium also was of great service in preparing and forwarding foreign shipments of live fish and eggs which were made to Puerto Rico, Panama, and Venezuela.

As usual the display of model hatching apparatus was kept in operation for the purpose of illustrating the methods followed in incubating various types of eggs.

DISTRIBUTION OPERATIONS

The large number of fish distributed in the waters of the national forests and national parks was to a large extent handled by those agencies themselves. In a number of instances sportsmen's clubs cooperated in distributing fish throughout a large territory. This was particularly evident in connection with the operations at the Spearfish, S. Dak., station. The trend is constantly toward the use of trucks for distribution purposes, and the fish cars are used only for the longer hauls.

The distribution cars engaged in the delivery of fish to applicants this year made 65 trips and carried an average of 250 pails per trip. The cars traveled 45,435 paid miles and 8,958 free miles. Detached messengers made 49,665 paid miles and 4,725 free miles in delivering fish to applicants. Truck deliveries during the year aggregated 40,351 miles. As formerly, the Bureau received free transportation and reduced rates from a number of railroads.

It is the Bureau's policy to notify applicants when their fish are ready for delivery and ask them to call at the hatchery to receive them. After the applicants have been notified and sufficient time has elapsed, if they do not call for their fish the same are planted in suitable waters. This course has been made necessary owing to shortage in distribution funds.

Summary, by States, of the distribution of fish, fiscal year 1935

State and species	Number
Alabama:	
Largemouth black bass	206,675
Loch Leven trout	10,000
Rainbow trout	3,250
Sunfish	263,925
Arkansas:	
Largemouth black bass	197,350
Smallmouth black bass	32,550
Rock bass	52,750
Sunfish	21,100
California: Chinook salmon	5,681,000
Colorado:	
Blackspotted trout	816,800
Brook trout	5,088,400
Loch Leven trout	302,000
Rainbow trout	1,573,000
Connecticut:	
Brook trout	8,100
Rainbow trout	16,700
Smallmouth black bass	7,500
Delaware: Largemouth black bass	3,375
Florida: Sunfish	500
Georgia:	
Brook trout	91,000
Catfish	3,910
Largemouth black bass	281,300
Rainbow trout	40,240
Sunfish	269,300
Idaho:	
Blackspotted trout	216,000
Brook trout	378,000
Largemouth black bass	6,100
Loch Leven trout	18,000
Rainbow trout	762,000
Steelhead salmon	12,000
Illinois:	
Brook trout	125
Catfish	1,000
Largemouth black bass	17,100
Smallmouth black bass	300
Rainbow trout	375
Sunfish	2,600
Indiana:	
Brook trout	28,750
Catfish	750
Largemouth black bass	58,750
Smallmouth black bass	8,960
Rainbow trout	168,500
Rock bass	500
Sunfish	4,200
Yellow perch	600
Iowa:	
Catfish	2,000
Crappie	20,700
Largemouth black bass	39,650
Rainbow trout	15,500
Loch Leven trout	4,000
Sunfish	6,700
Kansas:	
Crappie	6,800
Largemouth black bass	1,925
Rock bass	2,100
Sunfish	2,200
Kentucky:	
Largemouth black bass	223,640
Smallmouth black bass	10,500
Rock bass	3,350
Sunfish	16,900
Louisiana:	
Largemouth black bass	24,760
Sunfish	13,730
Maine:	
Atlantic salmon	85,000
Brook trout	1,805,100
Flounder	774,000,000
Landlocked salmon	238,300
Smallmouth black bass	33,750
Maryland:	
Brook trout	58,110
Largemouth black bass	1,350
Smallmouth black bass	550
Loch Leven trout	900
Maryland—Continued.	
Sunfish	41,000
Rainbow trout	17,300
Massachusetts:	
Brook trout	275,900
Catfish	1,800
Flatfish	144,518,000
Mackerel	2,123,000
Pollock	95,782,000
Loch Leven trout	3,000
Lake trout	1,750
Landlocked salmon	2,000
Rainbow trout	8,375
Smallmouth black bass	341,800
Michigan:	
Brook trout	389,700
Lake trout	174,000
Loch Leven trout	21,000
Largemouth black bass	13,300
Smallmouth black bass	29,850
Pike perch	600,000
Rainbow trout	293,600
Sunfish	9,740
Whitefish	1,500,000
Yellow perch	1,500
Minnesota:	
Brook trout	243,900
Catfish	279,000
Carp	1,601,000
Buffalofish	10,770
Crappie	3,033,000
Lake trout	119,000
Largemouth black bass	18,580
Smallmouth black bass	3,100
Rainbow trout	48,800
Loch Leven trout	61,800
Pike perch	5,020,000
Sunfish	3,265
White bass	1,800
Yellow perch	383,000
Mississippi:	
Largemouth black bass	180,175
Sunfish	201,000
Missouri:	
Catfish	400
Crappie	17,450
Largemouth black bass	94,020
Rainbow trout	3,240
Rock bass	20,900
Sunfish	6,240
Montana:	
Blackspotted trout	414,420
Brook trout	139,615
Catfish	87,530
Crappie	53,600
Largemouth black bass	121,950
Loch Leven trout	2,252,000
Sunfish	91,200
Yellow perch	5,800
Nebraska:	
Brook trout	274,300
Catfish	2,800
Crappie	1,500
Loch Leven trout	138,800
Largemouth black bass	11,950
Rainbow trout	609,300
Sunfish	1,675
Yellow perch	3,000
Nevada:	
Catfish	200
Largemouth black bass	800
New Hampshire:	
Brook trout	79,400
Catfish	9,400
Landlocked salmon	7,000
Rainbow trout	9,200
Smallmouth black bass	500
New Jersey:	
Largemouth black bass	32,400
Rainbow trout	5,000
Sunfish	75
Yellow perch	500

Summary, by States, of the distribution of fish, fiscal year 1935—Continued

State and species	Number
New Mexico:	
Blackspotted trout	36,000
Crappie	800
Largemouth black bass	146,450
Rainbow trout	12,000
Sunfish	158,400
New York:	
Brook trout	413,500
Lake trout	322,000
Landlocked salmon	500
Loch Leven trout	94,000
Lake herring	2,610,000
Rainbow trout	19,200
Smallmouth black bass	73,200
Whitefish	679,000
North Carolina:	
Crappie	2,500
Largemouth black bass	58,000
Shad	2,775,000
Yellow perch	6,600,000
White perch	920,000
Sunfish	30,325
North Dakota: Rainbow trout	1,000
Ohio:	
Brook trout	6,300
Catfish	8,250
Loch Leven trout	9,500
Largemouth black bass	15,300
Smallmouth black bass	32,400
Rainbow trout	10,800
Sunfish	11,450
Whitefish	37,000,000
Oklahoma:	
Catfish	11,600
Crappie	90,200
Largemouth black bass	28,800
Sunfish	62,950
Warmouth bass	21,800
Yellow perch	2,630
Oregon:	
Black-spotted trout	85,000
Brook trout	385,000
Chinook salmon	5,364,000
Loch Leven trout	305,000
Rainbow trout	6,000
Silver salmon	362,000
Steelhead salmon	489,000
Pennsylvania:	
Brook trout	345,000
Catfish	2,975
Largemouth black bass	2,100
Loch Leven trout	221,200
Rainbow trout	215,800
Sunfish	4,000
Yellow perch	9,300
South Carolina:	
Catfish	170
Crappie	500
Largemouth black bass	223,000
Shad	371,000
Sunfish	137,000
Warmouth bass	8,000
South Dakota:	
Black-spotted trout	122,200
Brook trout	324,000
Catfish	600
Largemouth black bass	14,000
Loch Leven trout	609,500
Rainbow trout	649,300
Tennessee:	
Brook trout	98,600
Catfish	5,225
Tennessee—Continued.	
Crappie	315
Largemouth black bass	59,000
Smallmouth black bass	385
Loch Leven trout	5,000
Rainbow trout	150,000
Rock bass	9,150
Sunfish	37,700
Texas:	
Crappie	5,335
Largemouth black bass	241,800
Sunfish	45,600
Rock bass	750
Utah:	
Black-spotted trout	640,000
Brook trout	682,700
Largemouth black bass	2,100
Loch Leven trout	1,514,000
Landlocked salmon	18,200
Rainbow trout	478,700
Vermont:	
Atlantic salmon	5,000
Brook trout	1,984,300
Landlocked salmon	33,000
Loch Leven trout	2,000
Rainbow trout	2,050
Smallmouth black bass	49,765
Virginia:	
Catfish	1,200
Brook trout	315,975
Largemouth black bass	15,150
Smallmouth black bass	8,830
Loch Leven trout	2,800
Rainbow trout	248,800
Rock bass	19,300
Shad	11,430,000
Sunfish	52,700
Yellow perch	451,000,000
Washington:	
Black-spotted trout	638,000
Brook trout	697,500
Chinook salmon	8,554,000
Landlocked salmon	25,900
Loch Leven trout	165,500
Rainbow trout	279,250
Silver salmon	413,000
Sockeye salmon	404,000
Steelhead salmon	523,000
West Virginia:	
Brook trout	1,490,000
Largemouth black bass	51,000
Smallmouth black bass	10,000
Loch Leven trout	119,000
Rainbow trout	367,000
Rock bass	200
Sunfish	22,000
Wisconsin:	
Brook trout	623,400
Catfish	17,600
Largemouth black bass	188,300
Smallmouth black bass	5,310
Loch Leven trout	251,400
Rainbow trout	258,300
Sunfish	26,300
Wyoming:	
Black-spotted trout	871,000
Brook trout	1,226,000
Catfish	2,850
Largemouth black bass	7,350
Loch Leven trout	360,000
Rainbow trout	451,000
Yellow perch	32,200

NOTE.—All buffalofish and carp shown in the above table are planted in commercial areas of the Mississippi River.

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